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Determination of Effective Factors of Food Waste Attitudes of Romanian Consumers

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Abstract: Romania has a framework legislation for the reduction of food waste, a framework focused more on the prevention of food waste. Food waste education can be provided by higher education institutions that have an important impact on training and preparing the upcoming next generation for a sustainable economy and developing strategies to encourage activities to reduce food waste. The purpose of this study is to examine the consumption behavior regarding food waste and determine the factors towards attitude regarding food waste. A total of 1119 respondents participated by completing an online questionnaire. To determine the effective variables on each dependent variable and put forward the relations between these categorical variables, CHAID and multiple correspondence analysis were applied. As a result, we were able to condense consumers' perception, attitude and behavior regarding food waste, involvement, and participation in the prevention of food waste of respondents. The results can be used for a new range of offers for university canteens and services addressed to the target group by suppliers. This can also lead to stimulation of the activities of small producers and orientation towards domestic products.

Keywords: food waste; consumer behavior; perception; attitude; reducing waste

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1. Introduction

The European Union, together with all its member countries, is dedicated to achieving this goal, as waste prevention is a crucial strategy recommended by circular economy policies and the requirements of the European Green Deal. Herzberg et al. [1] and Antoneac et al. [2] emphasized that the first steps towards solving food waste are raising the level of awareness and understanding of the necessity of recycling in order to understand change for the better. Food waste is a critical problem which manifests itself both locally and globally, as observed by Guillaume Le Borgne et al. [3]. Globally, the problem of food waste has acquired environmental and economic dimensions and it is bundled with the social and moral conditions that affect consumers. In recent decades, food waste has reached alarming proportions with economic, social and environmental implications. Food waste remains one of the major obstacles to transitioning to a circular economy before 2050. The causes of household food waste—which is responsible for most wasted food—identified up to the present time include incorrect planning of shopping and meals, some fruits and vegetables being considered "ugly", impulse purchases due to promotions in stores, and packaging of inappropriate sizes. In turn, standardized portions and overestimation of the number of customers are among the reasons for food waste in restaurants and food establishments.

The European Commission considers that the labeling of food with "guarantee period" and "use before" is another reason for food waste. A better understanding of labels could potentially reduce food waste. Reducing food waste is necessary in the fight against climate change. Food waste is responsible for greenhouse gas emissions from the EU's food system as a result of the production and transport of food that is subsequently thrown away. Reducing food waste has another objective of the "Farm to consumer" strategy, namely clearer labeling of expiration dates to help reduce food waste. Identifying food losses along the entire food supply chain and donating food are other ways of reducing unnecessary food waste. Beyond the social and moral aspects, waste also translates into considerable negative effects on the environment: loss and waste of water; soil and energy resources; greenhouse gas emissions and contribution to climate change; and pollution (water, air, soil) with fertilizers, pesticides, and methane resulting from decomposition of food that ends up in the landfill.

Thus, education and information regarding the importance and benefits of preventing and reducing food waste are tools that will lead to a change in the behavior of society in general in the future and that will contribute to the achievement of the global objectives regarding the reduction of food waste, it being necessary that these measures are supported and conjugated.

The research objectives were to clarify:

- The concept of food waste and to identify the consumers' perception, behavior, and awareness related to food waste;
- To identify the factors that have led to the increase in the size of the food waste phenomenon;
- To identify strategies to eliminate/reduce this phenomenon;
- To identify tools to increase the degree of knowledge and awareness, transparency, visibility, and collaboration on the entire food chain in terms of controlling the phenomenon of food waste.

2. Literature Review

2.1. Food Waste a Global Problem

The attitude and behavior of consumers regarding food waste was addressed by the authors from all countries taking into account the culture and education of consumers. Sujita Pandey et al. [4] mention that food waste reduction behavior is directly influenced by education, income, diet and body mass index. Solutions to improve consumer attitude and concern towards the environment have been suggested by Sujita Pandey et al. [4] and by Yeon A. Hong et al. [5]. Their solutions [4,5] positively influence food waste reduction behavior, but it is also necessary to consider lifestyle food choice reasons to effectively influence food waste reduction behavior, a direct cause of consumer purchasing behavior.

Stöckli et al. [6] and Chinie [7] suggested to intervene in the reduction of food waste through a framework of social norms, commitments and rewards, as well as penalties used to change the behavior of buyers. Thus, [7] showed that the most advantageous are the informational interventions frequently used in Swiss society. They also argued that against food waste, the establishment of a framework with standardized definitions and measurement methods should be considered to allow the precise identification of long-term effects short and long.

Gaiani et al. [8] aimed at investigating the behavior of Italian households and identifying the factors that lead to the generation of food waste, through an approach to what is wasted and why it is wasted. Gilli et al. [9] also obtained the same results which, provided an image of food waste related to the aspects of behavior towards food, shopping, their storage methods, and giving an explanation regarding the causes of food waste.

Gilli et al. [9] and Nimeshika Aloysius et al. [10] investigated the relationship between individual motivations and behaviors of recycling and minimizing uneconomical food waste and how personal and lifestyle factors can influence food waste. The results show that recycling behavior does not correlate with individual motivations, while waste minimization appears to be associated only with intrinsic motivation. Egolf et al. [11] and Govzman et al. [12] aimed to provide an understanding of the relationships between food disgust sensitivity and food preferences, habits and behaviors, as well as the frequency of food waste (including here also seafood).

Cadario and Chandon [13] and Harvey et al. [14] found in their studies that although most consumers do not intend to waste, they still end up wasting food. The studies had an impact for political decision-makers but also for managers looking to reduce food waste at the household level, with an impacts on behaviors related to food waste classified according to Guillaume Le Borgne et al. [3] into economic concerns, food involvement, and food education.

For the Greeks, this food waste was addressed by Pitoska and Damianos [15] and Pitoska and Vaya [16]; they identified that the problem of food waste is known in Greece but that consumer information is more limited regarding the European objectives for reducing food waste. Pitoska and Vaya [16] concluded that with the increase in the number of food markets, the effect is correspondingly accompanied by the increasing effect of food waste but also by irrational food management. The results of the Danish respondents show that the norms and attitude of consumers towards food waste have a significant impact on food waste, as well as shopping planning, the so-called household list, while moral norms and control do not have significant contributions.

Another point of view addressed the problem of food waste along the food supply chain in a high-income country where food waste generated at the household level accounts for approximately half of all food waste in Stancu et al. [17] opinion. Dyen et al. [18] the study shows that material dimensions, time pressure, commitments, and social relationships condition global arrangement of food practices variably. The results provide new intervention perspectives on daily household consumption through global understanding the dynamics of eating routines. Leverenz et al. [19] mention that Sustainable Development Objective 12.3 is the halving of food waste by 2050, this being the key to securing a food system that is sustainable. A possible solution for reducing food waste is presented by Soma et al. [20] as being possible through an approach to household food waste through some education campaigns. Silva et al. [21] also emphasize the need to educate consumers about responsible consumption. These measures will help promote sustainable and efficient food systems, minimizing the negative effects of food waste.

Citizens' lives have changed, so new barriers to prevent food waste have appeared. Massari et al. [22] observed in their studies that consumers' attitudes have been changed because they manage time to prepare food, saving money, valuing food, healthy eating, and protecting the environment. A new mission is on the horizon to shift to a sustainable resource—to an efficient economy—by reinventing the design, manufacture, and sale of products and by rethinking the way products are consumed through reuse and recycling.

2.2. Universities and Their Role in Research Regarding Food Waste

In the last decade, various methods of intervention against food waste by consumers have been identified. In the academic environment, the examination and identification of ways to prevent food waste by consumers has also begun. Dongxu Qu et al. [23], for example, study and verify the students' behavior and attitude towards food waste separation from the point of view of the efficiency and effectiveness of food waste management at Henan University in China. Through this study [23], the results showed that their attitude

and awareness was relatively positive about the importance of waste separation, but they still do not have sufficient knowledge about waste separation.

Understanding consumer behavior regarding food waste has become increasingly important given the negative impact on sustainability. Therefore, Sunjita Pandey et al. [4] carried out a study to identify consumers' reasons for choosing food and the factors that influence food waste reduction behavior in university canteens, including social influence, concern for the environment, and lifestyle. They [4] applied an online questionnaire to student users of university canteens in Denmark. Pandey identified four types of consumers: familiarity-sensitive consumers, carefree consumers, health and mood food consumers, and unfamiliar consumers. Hennchen [24] also used the theory of social practice to explore the food waste produced by university students living in student dormitories and together with Ozanne et al. [25] identified that the most important factors leading to food waste among college students were disorganized meal planning and shopping practices, as students did not [22] make grocery lists, plan meals, or take inventory before shopping. Ozanne et al. [25] noticed that students were not properly sorting food waste because they did not always have proper bins to allow food waste to be separated. Additionally, Ozanne et al. [26] introduced the term refrigerator ethnography, referring to the fact that both fresh food and leftovers are frozen in the refrigerator until they were no longer edible, which can be considered an important reason why food is wasted.

Filho et al. [26] stated that food waste is a serious problem. That is why they subjected universities to the study and identified possible circular economic strategies, which are used to help promote sustainable development. Romani et al. [27] investigated how individuals' daily eating practices lead to food waste and identified the specific causes of food waste and the consequent actions to reduce it, triggering a change in students' eating habits. Soma et al. [20] identify several factors influence the problem (gender, age, season, consumer behavior). Amicarelli et al. [28] pointed out that the younger generations are completely aware of the phenomenon of food waste; they are largely interested in environmental issues but still generate huge amounts of food waste. Therefore, orienting their attitude by presenting more sustainable behavior models through food education is a solution involving the culture surrounding sustainable development. Wakefield and Axon [29,30] considered older consumers to be lower producers of food waste compared to younger ones. Older people are more likely to throw away less food in light of life experiences such as austerity or food rationing from earlier times of crisis. In addition, the presence of small children is likely to increase the amount of food waste per household.

Soma et al. [20] instead examined the effectiveness of three types of designed information campaigns in sensitizing households to the issue of food waste and encourage them to reduce food waste. This was the first study which used games as a behavior-changing tool for the reduction of wasted food. Another type of educational campaign took place through a different approach to food waste—one group used a passive approach (cards), and another used an approach involving the help of games. Consumers using games have been found to generate less edible food waste [29,30]. The conclusion is that the potential of games as an education tool is beneficial.

Food management behaviors for reducing food waste have been readapted in terms of checking labels, composition, expiration date, and storage instructions on the packaging; reusing leftovers; freezing leftovers; and checking the fridge before shopping being replaced with the home list. A new food preparation behavior—creative cooking by combining ingredients left over from other meals or batch cooking—seems to be a the new way to stop food waste.

2.3. Motivation of the Study

Cantaragiu [31] focused on the Romanian problem of food waste that contributes to economic disparities, social inequalities, and environmental pollution. It identified factors that cause food waste at different stages of the food supply chain, including the consumption stage. In his study, Cantaragiu [32] showed that consumer gender is a factor affecting individuals' food attitudes and behaviors and a potential factor that could affect the amount of food wasted. Additionally, [32] been found that women exhibit food purchasing and preparation behaviors that can lead to food waste to a greater degree than men. The results show the need to adapt public awareness campaigns regarding food waste to the particularities of each gender in several age groups [33]. The main reasons why Romanians throw food after Gheorghescu and Balan [34] are: rapid decay, incorrect estimation of the amount of food consumed at a meal, and excessive shopping. The answers to the motives of food waste confirm the traditional conservative model of the Romanian household: large quantities of food are cooked at home and fresh food is preferred, which means that the older food which remains is thrown away [34].

Pocol et al. [35] carried out another approach to food waste in Romania. In the study carried out, they investigated the types of consumers at the national level according to their perception of food waste. They [35] observe that young people have not been raised to prevent food waste, and therefore that adults do not have such habits. Although [36] they have a good awareness of this topic, they do not consider themselves responsible for food waste. Romanian researchers Cantaragiu et al. [37], Muresan et al. [38], and Burlea-Schiopoiu et al. [39] investigated like Borghesi and Morone [40]—the way young people perceive the process of food waste and showed that the impact of the COVID-19 pandemic has influenced the behavior of reducing food waste and awareness among young Romanians and caused increased awareness of the consequences of food waste on the environment.

The purpose of this study is to evaluate the factors that influence the attitude of consumers towards food waste in order to identify educational solutions, tools, and methods in order change consumer attitudes and reduce food waste.

3. Materials and Methods

In total, 1119 respondents participated in the study. The targets were the staff and students from different years and different fields of specialization (engineering, management, business economics, social assistance, business management) from the Faculty of Sciences of Baia Mare, Romania. They were asked to complete a questionnaire which was administered online with Google Drive forms between October and November of 2024. To determine the effective factors towards food waste attitudes of Romanian consumers and take into account the current specialized literature, the following factors were taken into account: the traditional lifestyle, the perception and knowledge of the respondents about food waste, and the importance of the subject. The questionnaire was applied also to determine Romanian consumers' attitudes also took into consideration: the provenance of national or foreign products, quality of products, percent of budget used for healthy food, and importance of reducing food waste.

The structure of the questionnaire was divided into the following sections, as in Table 1.

Section 1: Individual traits are as follows: gender, age, education level, and job position;

Section 2: Consumer orientation for quality product: their opinion about importance of quality for products in Q1 and how much money from their budget they spend on buying food, using Item Q2;

Section 3: Consumer' behavior if they are throwing away food (B1) and if they have knowledge about eating healthy food, a healthy diet, and consuming organic fruits and vegetables, as shown by questions B2 and B3;

Section 4: Consumers' education culture, how often they cook at home, if they pay attention to provenance of products, and if they are oriented to organic products—Items C1, C2, and C3;

Section 5: Consumers' understanding of food waste, Items WF1–WF5, to determine the importance of food waste, reasons for throwing out food, food waste, and the motives of consumers.

Table 1. Questionnaire structure.

Question	Items	Factor
Age	A	Individual characteristics
Gender	G	
Education level	Ed	
Profession	Job	
Is the quality of products important?	Q1	Quality
I invest a percentage of the budget into healthy food.	Q2	
I throw away food.	B1	Behavior
I consume fruits.	B2	
I consume vegetables.	B3	
Products' provenance	C1	Culture
Did you choose organic fruits and vegetables?	C2	
Do you consume cooked food?	C3	
The products I throw out most are	WF1	Food waste
The reason I throw away the food is	WF2	
Mitigating food waste when preparing food	WF3	
Intentionally preparing enough food to have leftovers	WF4	
Food waste is an important issue that needs a strong, long-term solution	WF5	

Also a Likert scale were used from 1 to 5, where 1- not at all, 2-rare, 3-monthly, 4-monthly and 5-daily for items "I throw away food", "I consume fruits" and "I consume vegetables".

The Cronbach α coefficient, which showes the reliability of the scale is calculated as 0.857. related with earlier studies and literature, a value of Cronbach α greater than 0.70 indicates that the scale is reliable. Related with the type of the data set, which includes categorical variables, to determine the statistically significant variables and anlyze the relations among these variables, Chi Squared Automatic Interaction Detection (CHAID) and Multiple Correspondence Analysis (MCA), which give effective results and visual statistical results for multiple categorical data set, are applied via SPSS. 30 software.

The CHAID analysis separates the data set related to categorical variables and dependent variables into detailed homogeneous sub groups for best explanation. While doing this, the Chaid Analysis uses Chi-square significance test. To decide if the variables are proper for separation Bonferroni corrected p value is used [41]. Correspondence Analysis has been widely used in the analysis of categorical data in recent years. This method, which can be applied to many data matrices, is primarily utilized for analyzing two-way cross-tables involving two categorical variables. This analysis examines the relationship between variables by leveraging inertia values. Correspondence Analysis facilitates the solution by visualizing the joint variations of variables and their levels on a coordinate axis [42]. For more than two categorical variables, it is called as multiple correspondence analyses.

4. Results

4.1. Individual Characteristics

Regarding education level, 80.9% graduates from or engaged in academic studies, 19.1% graduated from high school or post-secondary school. The target group is educated and has all the information about healthy food and lifestyle and recycling problems. Regarding the characteristics of the respondents, the target group was made up of 71.84% women and 28.16% men. As Wakefield and Axon [29] considered age a positive variable in the direction of minimizing food waste, this study sustained the same variable influence. In our case, 37.44% o the respondents were between 21 and 30 years of age, and 39.58% were between 31–41 years old. Separate segments were of those aged between 41 and 50 years old (15.46%) and over 50 years old (7.5%).

4.2. Consumers' Education Culture About Quality Food

The quality of food also was taken into consideration as a possible factor contributing to food waste. The results regarding the consumers' budgets used for quality products are presented in Table A1 (Appendix A); 26.98% of respondents invest 50% of their budget into healthy food, followed by 22.43% of respondents spending 40% of their budget on quality products. The largest value obtained was 33.33% of respondents who invested 30% of their budget. To the question "Is the quality of products important? 97.2% of respondents answered that it is very important and that it is important to consume quality products and eat healthy food to avoid food waste. In conclusion, in the target group, culture and age did not influence consumers' attitude toward preventing food waste starting with themselves eating quality products.

4.3. Consumers' Perception Regarding Food Waste

Consumers' perception regarding food waste and the reasons why consumers throw away food are shown in Table A2 (Appendix A); 71.58% of the respondents throw away food because of the expiration date of the products. Another 14.65% consider other quality characteristics of the products, like changes in color or smell; 4.82% of respondents admit to improper storage of the product as another reason for throwing out food, and both actors—the store and the consumer—are responsible. In conclusion, age does not influence the perception of food waste and the attitude of consumers regarding this issue. Additionally, to identify which are products are thrown away most often, the question "The products I throw out most are" was asked.

Among the products to which buyers are most sensitive and which are thrown away most frequently for a percentage of 70.50% of the respondents are bakery and pastry products or the attractive and useful fast food products. In comparison, dairy products or meat products are thrown away in a low percentage of 25.92%, perhaps because consumers know that they are highly perishable and pay more attention. Regarding the question of consumers' awareness of mitigating food waste, the majority answered that "yes", they are aware and make an effort.

4.4. Consumers' Behavior Regarding Food Waste

Another factor which can influence the consumers attitude towards food waste was how often they are cooking food at home as a possible motive of food waste. The results are presented in Table A3 (Appendix A). The behavior of the consumers revealed the fact that 39.32% cook freshly prepared food weekly, compared to the traditional Romanian family that cooks two or three times a week. Consumer behavior has changed, especially after the pandemic period (online and catering services). Of the 15.37% representing the youngest generation, nearly in 13.76% belonging to the segment between 31 and 40 years

old prepare meals and food that do not require much time to prepare because, following the consumerist trend, they use a work program or online or catering service. However, 12.33% of respondents are from traditional Romanian families from the countryside, in which food is cooked every day, following the concept that nothing is lost, even if there is extra food. Consumer attitude toward food waste is a beneficial one. Thus, to the question "Intentionally preparing enough food to have leftovers?", 42% answered that it is "very important" not to waste food, and 55.58% answered that it is "somewhat important" not to have leftovers, showing us that they know the importance of this subject.

Additionally, consumers' behavior was included by the question regarding the perception of the phenomenon under research "Food waste it is an important issue that needs a strong, long-term solution?". For 21% of the respondents, they claim that food waste is important considering climate change and the possible food crisis in the years to come. In an equal 22.87% are consumers who consider the phenomenon important, but not now.

Consumers, regardless of age, have the necessary information and the necessary culture of what is good or not in the food field, but although they are aware of the current problem of food waste and its importance for the future, they still do not apply it in practice, reasoning that there are people paid to deal with its solution in the highest percentage of 43.96%. A surprise was the young generation, 16.62%, who selected the following answer: "Reducing food waste is not important".

5. Discussion

Based on the data obtained, in order to see if the level of awareness of consumers regarding food waste can and does influence the attitude of respondents, chi squared automatic interaction detection (CHAID) analysis was applied to the dataset.

The results of CHAID analysis are:

(a) Effective factors for reducing food waste by the frequency of cooking food in Figure 1;
(b) Effect of quality products upon consumers' food waste in Figure 2;
(c) Effective factors of the provenance of products to prevent food waste in Figure 3;
(d) Effective factors of the importance of food waste in Figure 4.

Figure 1 shows that consumers who consume cooked foods, 56.1% of respondents, consider reducing food waste a very important problem for society. Of these, 34.1% are of the younger generation, and in their opinion, food waste is not important on a personal level.

In total, 21% of respondents consider that mitigating food waste is important for the future; 22.9% of respondents do not consider food waste to be an important problem, and 17.9% throw food out because of the expiration dates of products.

The most important factor on consumers' consumption of quality products is the ratio of their budget that they invest in healthy foods, indicated in Figure 2.

Consumer behavior has changed opting for ecological and organic products due to the healthy lifestyle they have adopted, even if their price is still high. Among the 55.9% of consumers who invest between 30–40% of their budget, the consumption of organic fruits and vegetables was considered the most effective factor. Finally, from those consumers who consume organic fruit and vegetables less often or monthly, the most important factor is again a percentage of budget investment in healthy food from 30–40%. Therefore, Romanians started to pay attention to what and how they eat, and they reoriented themselves on the market, taking care of organic and eco products, especially from traditional producers or directly from producers in the country.

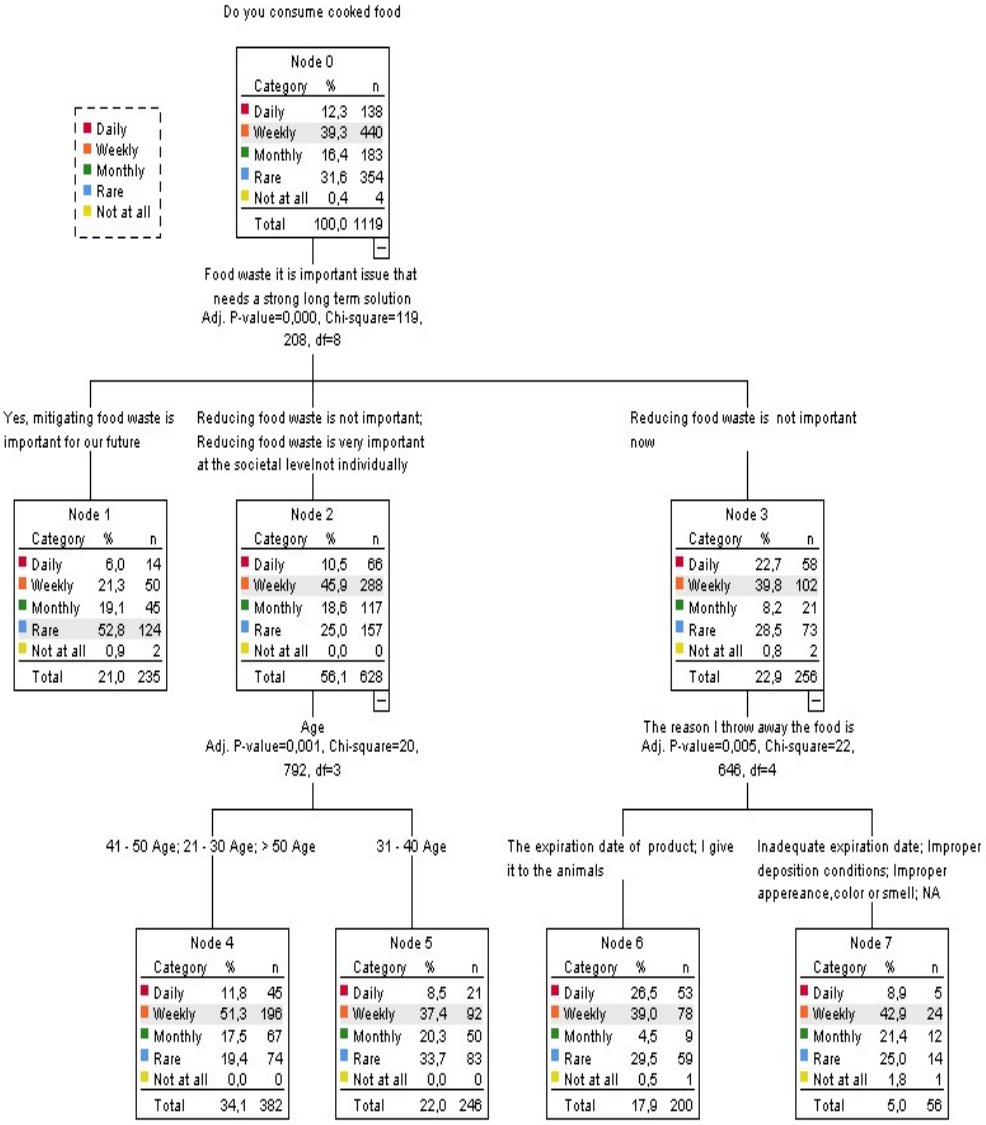

Figure 1. CHAID results for effective factors on reducing food waste.

As can be seen from Figure 3, age is the most effective factor on the origin of products. The percentage of the budget invested in healthy food is considered the most effective factor for those consumers who consume organic fruits and vegetables "weekly" or "not at all"; 9.4% percent of consumers used 30% percent of the family budget for healthy food. The generation between 21 and 30 years old is also oriented towards Romanian products (61.8%), which is encouraging with regards to supporting local producers.

As can be seen, 71.9% of consumers prefer the Romanian products. While the consumption of organic fruits and vegetables is an effective factor for consumers who are over 30 years old in (78%).

The results are similar with those provided by Rota et al. [43], which also suggest the importance of knowing the origin of food products and the challenges of the global–local food system.

The opinion of consumers regarding finding food waste is an important problem that requires a strong long-term solution, as shown in Figure 4.

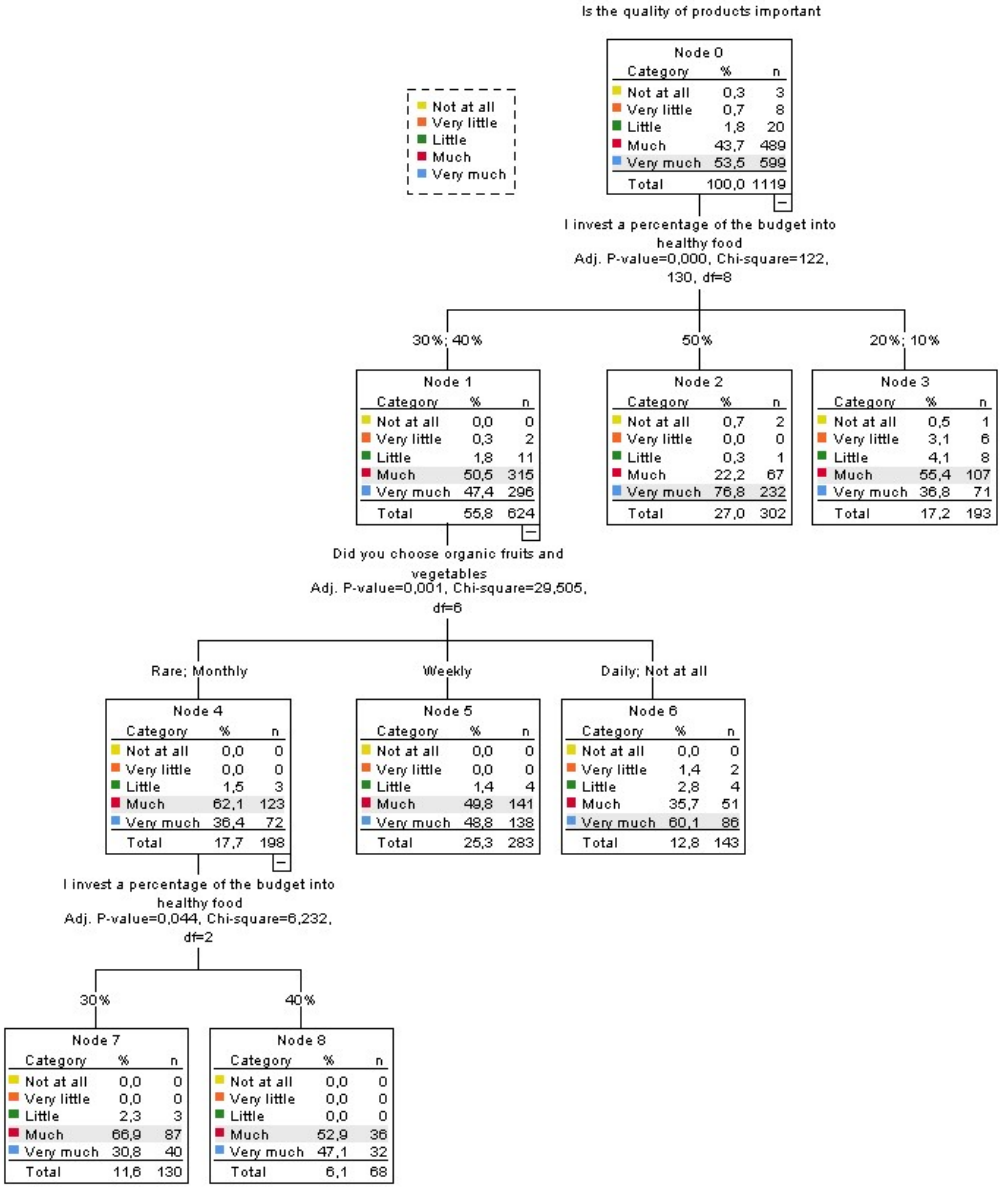

Figure 2. CHAID results for the importance of budget invest and consuming of quality products.

Among the 33.2% of consumers who answered the question with "Yes, mitigating food waste is important for our future", the type of product is found to be the most effective factor—namely, flour products (21.4%) and dairy and meat products (11.8%). On the other hand, the effective factor for the consumers who answered "No, mitigating food waste isn't important", the budget they invest in food procurement is found to be an important factor. In total, 10.2% of the consumers invest 40% of the family budget into food. It can also be seen that the percentage of daily food thrown away is significantly higher than the others, at 65.1%.

To determine the relations between the categorical variables, which are found to be significant, MCA (multiple correspondence analysis) was applied. Following the research of Costa et al. [44], by using MCA analysis, it was possible to determine complex data covering multiple and diverse variables. The MCA analysis was adapted to draw statistical conclusions, such as questions with multiple answers in our case study. The quantitative data such as age, budget, etc., were transformed into categories (using statistical quantities). To determine which generation contributes the most to food waste, joint plot category points were produced in Figure 5.

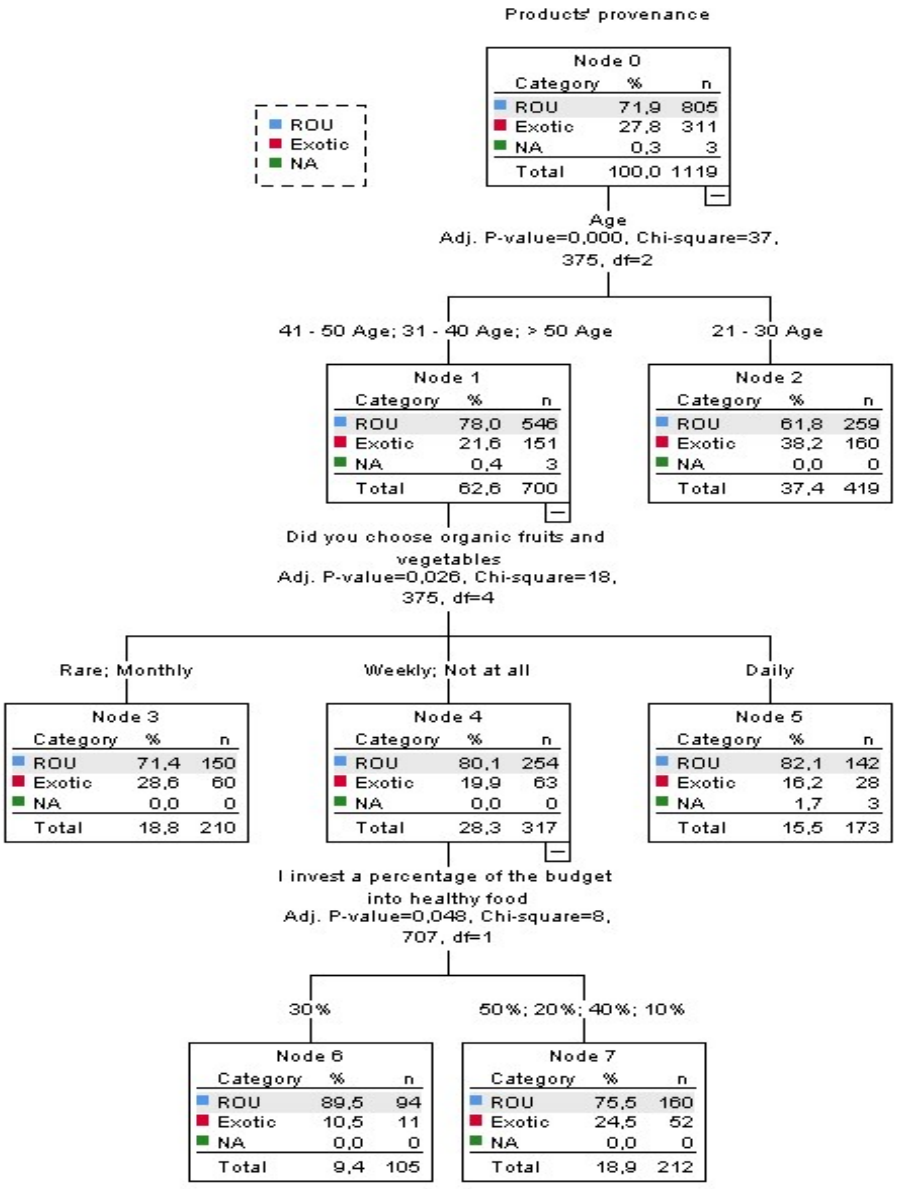

Figure 3. CHAID results for the products' provenance and age.

Figure 5 presents that individuals who consume Romanians' traditional (ROU) products are generally aged 50 or older, who daily or rarely consume organic -fruits and vegetables, and they invest approximately 30–50% of their budget into health food. The segment aged 31–40 consumes organic fruit or vegetables daily and invest 50% percent of their budget to procure healthy products. The younger generation prefers more exotic products weekly and they are investing only 40% from their budget.

Figure 6 represents that individuals who consume cooked food daily are generally aged 41–50, and they are of the opinion that mitigating food waste is important but are not sure, and the reason that they throw away the food is the expiration date of the product.

For the segment of the new generation, they throw out monthly food—taking into consideration the expiration date and availability, elements that are important for them—motivating improper deposit conditions. Referring to the importance of food waste, they consider the topic important for society but not on a personal level.

Figure 7 presents MCA results for product quality as a factor which contributes to food waste.

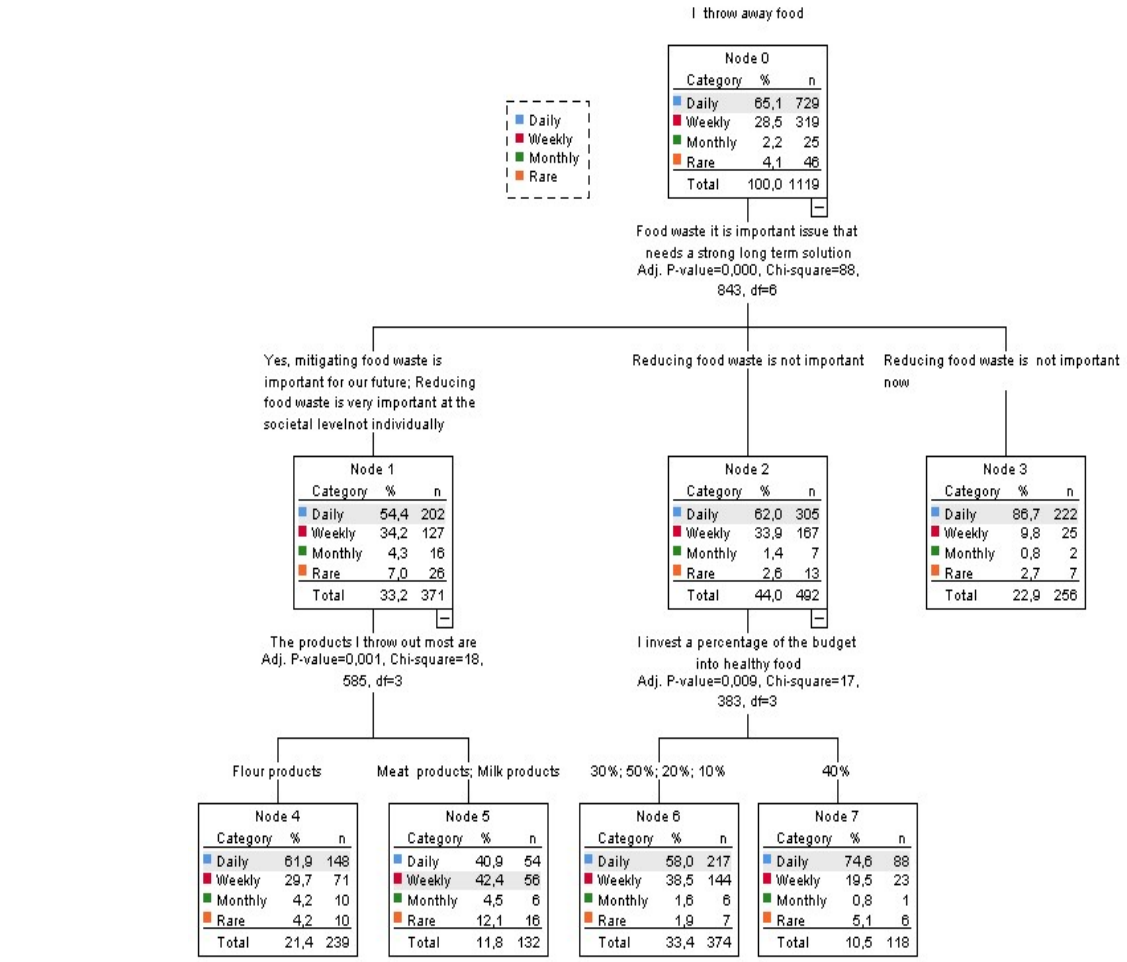

Figure 4. CHAID results for consumers' behavior regarding food waste and budget investment.

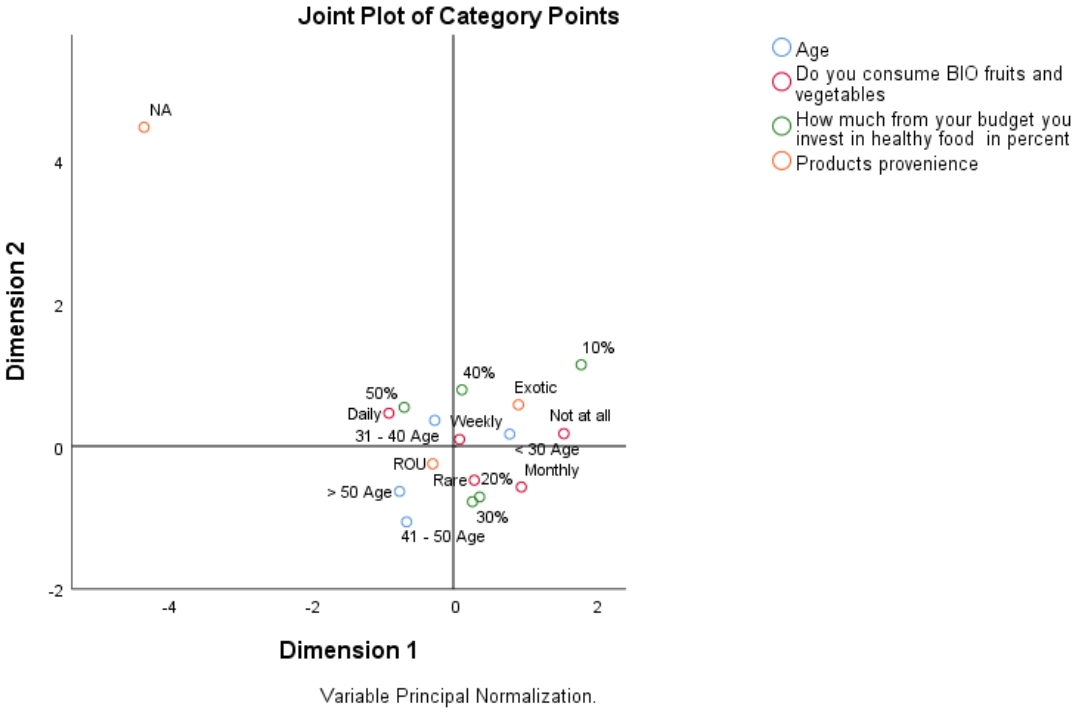

Figure 5. MCA results for consumer behavior as functions of age and products' provenience.

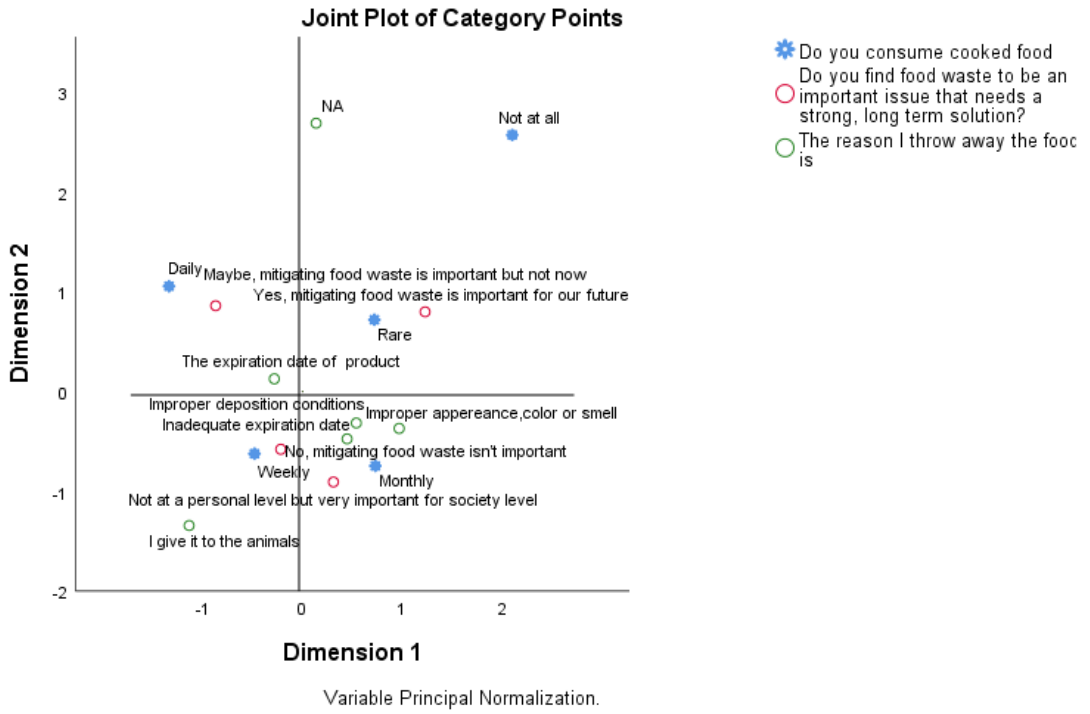

Figure 6. MCA results for consumer behavior as functions of age and reason for food waste.

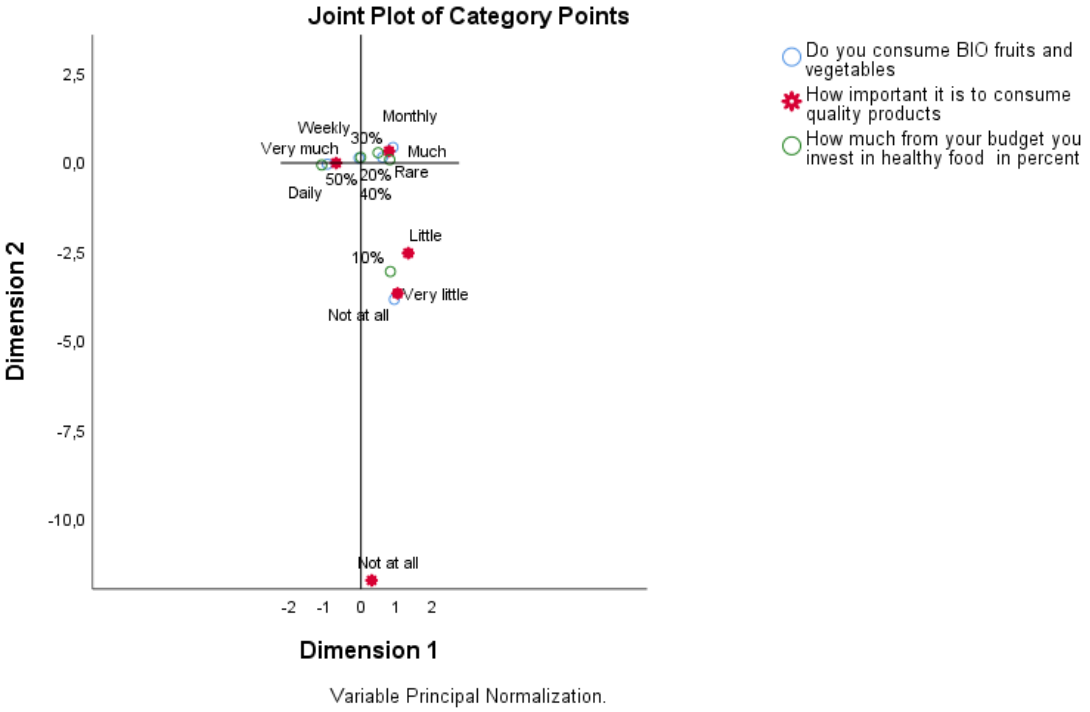

Figure 7. MCA results for consumer perception as a function of budget investment and product quality.

Individuals that think that consuming quality products is very important are those who consume organic fruits and vegetables daily or weekly, and they invest approximately 50% of their budgets into health food. The respondents who are invest 30% of their monthly budget into healthy food consider product quality to be just as important.

6. Conclusions

The purpose of the study was to determine the effective factors of food waste attitudes of Romanian consumers, and the results obtained sustain the results obtained by researchers from other countries. Age can be taken in consideration as a positive variable in the direction of minimizing food [20,30,33]. Gender is a factor affecting individuals' food attitudes and behaviors and a potential factor that could affect the amount of food wasted, especially for women [20,32,34].

The study concludes that although the younger generation has information and culture about healthy eating and food waste, they fail to put it into practice because they consider that there are people responsible for this problem. Additionally, they consider that young people have not been raised to prevent food waste [28,32]. The most important factor on consumers' consuming quality products consumer behavior has changed, opting for ecological and organic products due to the healthy lifestyle they have adopted, even if their price is still high [4,23,40]. Additionally, the percentage of budget which is invested into healthy food represents the most important factor on consumers consuming quality products, especially non-foreign fruits and vegetables (71.95%).

Following the study, responsible people and competent factors from universities can understand what the food system will look like as well as what innovations are needed to meet the needs and requirements of the future. Some solutions identified are:

- Putting into practice the FIFO principle in finance, which means first in—first out, i.e., the first goods purchased are the first consumed, applying the same rule in the refrigerator or when arranging the food. Thus, everything can be consumed in a timely manner;
- Combating preconceived ideas by choosing fruits or vegetables that are less aesthetically pleasing but qualitatively better but which are often left behind in stores;
- Efficiency by fully cooking vegetables and leftovers from previous meals by changing old habits with the infinite possibilities of imagination.

Everyone has a role to play in preventing and reducing food waste, starting with farmers, food producers, and retailers; the cycle closes with the consumer.

Universities also provide an important role in the communication of legislation on food waste provided for operators in the food chain, mainly producers/processors and distributors—clear rules regarding the hierarchy for preventing the generation of food waste, as follows:

- Developing an anti-waste plan;
- Food donation;
- Recovery through composting;
- Valorization through transformation into biogas;
- Encouraging innovation in this field.

Universities can also have a role as educators by developing—through games and through technology—strategies that have been proven to generate a culture of recycling, respectively leading to less edible food waste [20,31,32]. Another choice can be the use of chatbots, useful programs which can influence the behavior and attitude of consumers, or sending automatic reminders and notifying consumers [45].

In conclusion, universities must find new solutions for the awareness and attitude of the young generation, especially using new technology they are dependent on, by promoting the importance of reducing food waste, such as via phone applications that allow them to keep an inventory of the products in the refrigerator and providing warnings of validity. The use of nanotechnology for product packaging, such as noting the expiration date by changing the color of the packaging, could also be employed. The initiative against

food waste in Romania provides a background for the discussion about the means by which universities with resources contribute to education on food waste through:

- Continuous investment and information with the help of last-generation technology;
- Aligning the initiative's expansion strategy with the creation of information platforms;
- Attracting the younger generation to voluntary activities.

Limitations of the Work

The study was limited to consumers from one university, but the model can be applied to other universities from abroad to create a cross-cultural model regarding food waste and finding common points.

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Appendix A

Table A1. Quality towards consumers.

Q1—I invest from buget for healthy food				
	Frequency	Percent	Valid Percent	Cumulative Percent
10%	32	2.9	2.9	2.9
20%	161	14.4	14.4	17.2
30%	373	33.3	33.3	50.6
40%	251	22.4	22.4	73.0
50%	302	27.0	27.0	100.0
Total	1119	100.0	100.0	
Q2—Quality product it is important?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very little	8	0.7	0.7	1.0
Not at all	3	0.3	0.3	0.3
Little	20	1.8	1.8	2.8
Much	489	43.7	43.7	46.5
Very much	599	53.5	53.5	100.0
Total	1119	100.0	100.0	

Table A2. Consumers' perception regarding food waste.

W1—The reason I throw away the food is	Age				Total
	21–30	31–40	41–50	>50	
The expiration date of product	290	312	135	64	801
Improper appearance, color or smell	79	56	20	9	164
Inadequate expiration date	25	23	7	4	59
Improper deposition conditions	23	45	9	7	84
I give it to the animals	2	2	0	0	4
Not at all	0	5	2	0	7
Total	419	443	173	84	1119
W2—What kind of products most I throw out are					
Flour products	293	330	114	52	789
Milk products	35	27	9	9	80
Meat products	91	86	50	23	250
Total	419	443	173	84	1119
W3–Mitigating food waste when preparing food?					
Yes	306	334	136	56	832
No	107	106	36	27	276
Sometimes	6	3	1	1	11
Total	419	443	173	84	1119

Table A3. Consumer ' distribution in terms of behavior regarding food waste.

Intentionally preparing enough food to have leftovers?	Age				Total
	21–30	31–40	41–50	50	
Not important	3	3	0	0	6
Neutral	6	10	4	1	21
Somewhat important	175	187	74	34	470
Very important	235	243	95	49	622
Total	419	443	173	84	1119
Do you consume cook food					
Daily	48	48	26	16	138
Weekly	172	154	77	37	440
Monthly	77	77	13	16	183
Rare	120	164	56	14	354
Not at all	2	0	1	1	4
Total	419	443	173	84	1119
Food waste it is an important issue that needs a strong, long term solution?					
Reducing food waste is not important now	83	99	47	27	256
Reducing food waste is not important	186	199	73	34	492
Reducing food waste is very important at the societal level, not individually	3	47	18	8	136
Yes, mitigating food waste is important for our future	87	98	35	15	235
Total	419	443	173	84	1119

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