The Openness of Slovakian Households for the "Zero-Waste" Movement

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Abstract: In addition to the deterioration of air quality, one of the most significant environmental pollutants we face today, is waste. In the past, humans lived in harmony with nature; today, only a few isolated indigenous tribes live this way. Society today is immeasurably wasteful. Our increased need for convenience and goods, we have ceased to pay attention to the damage we are causing the natural world. Due to the wide spectrum of the topic, our theoretical and practical focus was on the theoretical approaches and practical implementation of the zero-waste movement. The aim this present study is to assess the zero-waste concept of Slovak households and their openness to purchase in a sales unit operating in the above movement. We also describe the selective waste collection habits of households in Slovakia, as focusing on selective collection may be the starting point for a new environmental movement that will hopefully become even more widespread in the future. Our research is a multiple, descriptive, cross-sectional study in which correlations have been explored regarding the demographic characteristics of consumers and their environmentally conscious shopping habits. Based on our results, we can state that education systems and influencing messages through the media have fallen short, and that more work is needed in this area. This is despite the fact that Slovakia is a fairly environmentally conscious country, in relation to others, in the EU.

Keywords: environmental protection; selective waste collection; zero-waste movement; waste disposal

1 Introduction

From an environmental point of view, one of the most pressing problems today is waste management, of which, product packaging at both the household and organizational level, is an integral part. There have been a number of moves in the recent developments for waste minimization. One of these is the "zero-waste" movement. It is the name of a movement that is currently influencing a growing audience. The philosophy of the movement is based on the fact that it does not perceive the packaging of products, from an aesthetic or hygienic point of view, but sees in it, a problem that destroys the world. It aims to convince people to

reduce the waste they extract, to zero. This can sound quite radical and scary in many ways, but by taking small steps, we can significantly change our lifestyle. A good start is to give away things we don't use that just "take up space" in our home, as they can benefit others (e.g., overgrown clothes, school aids, etc.). The next step is to watch what new items we take home. Depending on the type of things to buy, we need to ask ourselves whether we really need that particular thing, whether we can buy that particular product without packaging, or whether it can be used multiple times. While we may think that this is not so necessary, as we select garbage anyway, which is then recycled by the right company, we are very wrong. We also have to reckon with two external factors, which are: waste recycling companies only recycle the materials they have a demand for, and we can't do garbage recycling indefinitely. [38]

In the present study, the authors discuss theoretical approaches to the concept briefly described above, and then, as a result of primary research, describe household's knowledge of the zero-waste concept in light of their demographic characteristics and trace consumer propensity for this type of business.

1.1 The Topicality of the Investigated Problem

The nature of circular systems requires the collective effort of all actors involved in the products life cycle, including businesses, consumers and governments. It is possible to integrate the lessons of behavioral sciences to design behavioral interventions to improve e-waste management and thus promote a more circular economy. [22]

The gap between the principles of the circular economy and consumer practices can be bridged through behavioral knowledge without significantly changing products life cycle systems. Behavioral strategies can be used, for example, to promote purchases of "green" products or alternative business models. Similarly, strategies may seek to encourage product reuse and improvement to extend the life of the product during its lifetime. Finally, at the end of a product's life, behavioral interventions can be designed to motivate users and facilitate timely and proper disposal to better manage e-waste. Understanding the social, economic, and psychological factors that influence human behavior can help develop effective strategies to engage individuals and businesses in a more circular economy. [5] [30]

The complex nature of human behavior is explained by different theoretical frameworks from different fields of study. There are several theories of behavior in the fields of psychology, sociology, anthropology and economics. Behavioral intervention based on theories widely used in public health is limited in promoting environmentally friendly behavior. The most common theories (and models) of environmentally friendly behavior can be grouped into moral, rational choices, and economic models. In addition, social marketing is a popular intervention strategy that exploits cognitive biases and social impacts. [22]

Figure 1
Elements of pro-environmental consumer behavior and their main connections
Source [22]

1.2 Theoretical Approach to the Zero-Waste Concept

Waste is practically the same age as humanity. Natural waste can serve as a raw material for other living organisms, so they can be part of the natural cycle.

After waste disposal became commonplace in the 19th Century, it was common practice until the 1960s and 1970s that garbage was transported outside of settlements to landfills. However, there is no mention of safe waste disposal here. During these decades, the concept of selective waste collection came to the fore, which proved to be a great initiative at the time, but by no means provided a perfect solution for waste management, as this method unfortunately, did not and still does not, solve the problem of landfilling or incinerators.

The concept of "zero-waste" has emerged in an innovative way in dealing with waste problems. Many researchers have already defined the concept in different ways. Zero-waste management is a holistic waste management concept that recognizes waste as a resource that is produced at an intermediate stage in the resource use process. To measure the performance and progress of zero-waste, it is important to have certain indicators that outline different waste management

systems and predict effective development scenarios. [9] Many indicators for waste management systems have already been developed by many researchers in many cities and countries. The currently available indicators are not yet sufficiently integrated and the evaluation of waste management systems is considered a key indicator. Therefore, a significant proportion of waste management research used different reporting, data representation and evaluation indicators without an appropriate comparative benchmark.

Waste experts have identified a number of indicators as key indicators for zero-waste systems. After an intensive review of the literature, the zero-waste indicators were divided into roughly seven different areas, such as geographical administration, socio-cultural, management, economic, environmental, organizational, and policy. [41]

The term zero-waste was first used publicly in the mid-1970s by chemist Paul Palmer Phd, who founded a company called Zero Waste Systems Inc. (ZWS) in Oakland, California. The company initially reused chemicals that had become redundant. Building on the same principles, Paul Palmer later founded the Zero Waste Institute (ZWI). However, the principle of the institute has evolved over time and all ideas about recycling are now rejected. Instead of recycling, the movement aims to raise awareness of the need to fundamentally change the design and distribution of products. The term zero-waste was first defined in 2004 by the Zero Waste International Alliance (ZWIA). According to the definition, zero-waste is a movement for ethics, economy and efficiency that serves as a guide for people to change their lifestyles and habits in a way that mimics sustainable processes that also take place in nature. Ideally, zero-waste can be used for other uses after each product has reached its original function. [43] They believe in prevention instead of ex-post waste management. According to their idea, they should be produced from materials that allow the finished products to "live" for nearly 100 years. And so that after their "warranty" expires, they can be used for other purposes in a similar way to the natural cycle. [3] [42]

Zero-waste as a form of third-generation waste management is based on a logical approach, the essence of which is to look for more efficient solutions for waste management than simply recycling. This is based on the fact that if products are manufactured to be reusable. In other words, the goal of the zero-waste movement is to use everything over and over again instead of producing waste, as opposed to the one-time approach. [35] [31] In this way, we can avoid the release of waste into nature, as all end-of-life products made with the zero-waste mindset will find a new, useful place in nature at the end of their "life". [17] In this sense, the focus will be on the practical implementation of recommendations aimed at:

a) Improving the fixation rate of reusable materials, recyclable materials and clean composites in door-to-door collection systems
b) Supporting waste avoidance strategies for local businesses
c) Improving the local use of some substances

d) Employing alternatives to the replacement of certain toxic substances (elements, paints, solvents, etc.) in products

e) More efficient industry design in terms of product packaging [6]

The basis of the waste management form is provided by a hierarchical system, which has long been known in the literature as 3R (reduce, reuse, recycle). However, in the last few years, professionals have added two more items to the development of environmentally conscious behavior. Currently, therefore, we are talking about a 5R hierarchy (see Figure 2).

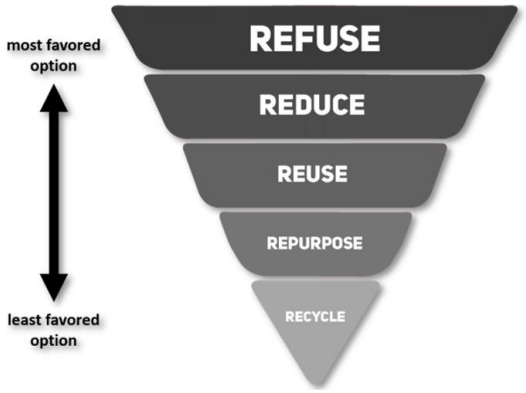

Figure 2
The 5R's of the zero-waste hierarchy
Sources [12]

The most advantageous ideas of the zero-waste 5R reverse pyramid are at the top, while the least advantageous options are at the bottom. The essence of each of the theories of the 5R concept is briefly described below:

1) Refuse – Sometimes as a consumer we have to say "no". It may take a while and you will need some practice, but this is just another "good habit". It would be wise to avoid buying wasteful or non-recyclable products such as wrapping paper and bubble wrap, as we can find many environmentally friendly alternatives instead. Making smarter purchasing decisions and setting standards and expectations early in the process will make it easier to "reject" waste. [32]

2) Reduce - Reducing the use of harmful, wasteful and non-recyclable products will result in less waste going to landfill and the associated negative environmental impacts. A great example is the reduction of unnecessary packaging of manufactured products. For example, you can buy a large bottle of water instead of a lot of small ones. Other commonly used items to avoid are disposable plastics, plastic packaging and Styrofoam cups. This can save energy, money, and reduce the amount of waste that needs to be recycled or sent to landfills. [16]

3) Reuse – It is crucial to reuse batteries that can be used after our needs have been met, and that can work in other areas. Almost everything we buy or use in our daily lives ends up in landfills, pollutes our oceans, contributes to emissions of harmful greenhouse gases such as CO2, or otherwise damages the planet. The solution may be to reduce our consumption in order to reduce the environmental impact, for which the key is, of course, to reuse. [13]
4) Repurpose – By transforming objects and tools that are no longer used, the tools are given a different, more practical form of use, and can thus be used further. You can simply take something you no longer use and transform it into another object for more practical use, e.g. an old sewing machine that is no longer used can be converted into an authentic table, etc. [39]
5) Recycle - Recycling is the most environmentally friendly method of waste management. Mixed paper products, mixed materials (plastics, aluminum, glass) and organic materials are recyclable products. [1]

In the literature dealing with the concept of zero waste, we find a reference to the fact that the terms "recover", "repair" or "rot" are added to the lowest level of 5R. It also depends on the nature of the product that what other ways exist to assign a new / re-function if a product no longer works in its original role. [14]

Conscious consumer education in the direction of environmentally friendly consumer behavior is an ongoing task, as it aims to reshape a complex mix of behavioral patterns while consumers seek ethical alternatives, other social and economic forces influence their behavior (e.g. family, comfort, price), so positive consumer decisions are not always made. [8] [33] Recycling is a post-purchase consumer activity where the consumer usually considers not only individual but also social goals, ideas and ideologies. Accordingly, ethics are an integral part of recycling. [36] The more consumers consider recycling to be morally intensive, the more favorable their attitude will be. Attitudes, on the other hand, have a positive effect on the intention to recycle. [34] In addition, a higher level of moral obligation has a positive effect on the intention to recycle. [7] According to Park-Ha [24] research, consumer-specific personal norms as well as attitudes and perceived behavioral control influence the intention to recycle. In addition, subjective norms also influenced the intention to recycle indirectly through attitude, personal norms, and perceived behavioral control. The researchers found that consumer awareness of the consequences typically influenced the intention to recycle indirectly through attitudes, subjective norms, and personal norms. In their research, Li-Yang-Sun-Wang [18] examined recycling behavior in terms of financial and non-financial incentives, explaining their different effects on consumer recycling behavior. The novelty of their research is also demonstrated by the introduction of the concept of emotional involvement in the definition of recyclable objects. Based on primary research, Young-Hwang-McDonald-Oates [40] reports that while consumers are very concerned about environmental issues, they find it difficult to pass on these concerns to their purchases. Environmentally

conscious behavior, concern for the environment has a positive and direct impact on environmental knowledge, beliefs, and behavioral intent. In addition, demographic data determines the level of concern for the environment and environmental knowledge. [23] [15] Consumers' environmental awareness and social norms have a positive effect on their environmental attitude, as well as their environmental knowledge and social norms on their sense of well-being. [4] [10] Consumers' willingness to buy and behave towards green products point, and accordingly, companies need to respond to consumer needs and fulfill their social responsibility in marketing green products to meet consumer needs. [19] [21] In their research on the margins of green consumption, Pinto-Nique-Herter-Borges [25] researched how the emergence of personal and social identities can change the relationship between different intentions and green consumption. The results show that when personal identity is prominent, self-transcendencing intentions have a greater impact on green consumption than self-improvement intentions. This is because personal identity (relative to social identity) increases the positive impact of congruent intentions (self-transcendence) on green consumption. However, if social identity is prominent, self-transcendental and self-improvement intentions have a similar effect on green consumption. The reason for this is that social identity (compared to personal identity) reduces the negative impact of self-improvement intent on green consumption.

In the field of environmentally conscious behavior, consumers giving up the use of plastic bags during shopping it is already a significant step forward. Their harmful environmental effects, including production energy costs, limited lifespan, increasing landfill content and inability of biodegradation, are symbolic and practical evidence of a 'disposable' consumer culture. This is a major barrier to sustainable consumption and development in particular. [28] [37] Solving these problems is not a one-off but is instead a complex task involving a change of approach that requires cooperation both at the national and international levels. The state, municipalities, companies (most organizations in general) and individuals have an equally important role to play in the process. [2] [29]

2 The Aim of the Study and the Applied Research Method

On one hand, we aimed to synthesize and summarize the research results related to household waste management, within which we paid special attention to the knowledge of the zero-waste concept we researched and to the mapping of the willingness to buy into this lifestyle while taking into account demographic characteristics.

In order to achieve our goal, we have formulated our main research questions:

- Do customers have knowledge of the concept of zero-waste?

- Are they open for shopping in this type of store?
- To what extent, do Slovak households implement selective waste management?

Our hypotheses related to our research questions are the following:

H1: More and more people are familiar with the concept of zero-waste, led by those with higher education and urban residents.

H2: The zero-waste business is most likely to be dominated by shoppers with children and higher education who pay attention to the environmentally friendly packaging of the product, and over time, more and more people would be willing to buy into this type of business.

The empirical research was based on online questionnaire research. The questionnaire examines the behavior of the participants, thus also having the disadvantages of the interview method, i.e., the respondents may not be willing and able to provide accurate information to the questions asked. In addition, answering personal and sensitive questions can be a disadvantage. The questionnaire query was followed by data cleansing and evaluation. To test our hypotheses, we conducted multiple descriptive cross-sectional researches, all the more so as we obtained our data multiple times on a single sample.

Our sampling technique was non-random sampling, within which we used the snowball method. The first survey was conducted in March 2020, and we were able to evaluate 240 completed questionnaires. The questionnaire consists of a total of twenty-five questions, of which ten are related to the person completing the question, thirteen are questions about what kind of shopping habits they have and how they relate to environmentally friendly products, one question is about their fluid consumption and one about their waste management habits. The second survey was conducted in July 2020, with 163 evaluable responses. This questionnaire included questions from the first research and, in addition, was expanded with two further questions. One question concerned whether the respondent participated in our March research. Due to the changed economic and health situation in the meantime (the globalization of the COVID19 epidemic), we felt it was necessary for the other questions to look for an answer to whether people would spend more money on a more environmentally conscious lifestyle in the absence of the epidemic. The third research was conducted in January 2021. We received 145 answers. It was almost identical to the July questionnaire, with only one question added, which was nothing more than whether the respondent had completed the July questionnaire. The completed questionnaires were coded, and then the obtained values were recorded in the table of the SPSS statistical program. Evaluation was also performed using this program: univariate, bivariate, and multivariate analyzes were performed.

In all three of our surveys, the majority of our questionnaire (over 80%) was completed by female respondents, of whom approx. those with at least one child and adults without children were half-represented. With regard to the monthly

income of the respondents, it can also be said that in the order of 50-50% of the sample are persons with an income below 600 EUR and above 600 EUR, respectively, despite the fact that 43% of our respondents are in chronological order, 51% and 36% respectively have a higher education degree. We consider it important to note that in Slovakia in 2021, the minimum wage will amount to 623 EUR, while the average wage will range from 1,100 EUR to 1,200 EUR. The general validity of our results must therefore be viewed critically in this light, as our findings can be made mainly for the groups with the demographic characteristics described above.

3 Research Results

Our first hypothesis was as follows:

H1: More and more people are familiar with the concept of zero-waste, led by those with higher education and urban residents.

To determine whether the hypothesis was true or false, we first examined what percentage of respondents indicated in each survey that they were familiar with the concept of zero-waste. After performing the cross-tabulation analysis, we drew a trend line for the obtained results, from which, unfortunately, the negative trend of the knowledge of the concept can be read, which was also confirmed during the forecasting of the future prognosis.

In the course of further analyzes, we looked at whether there was a significant correlation between the time of the query and the knowledge of the concept of zero-waste. Our chi-square value is 53.639 at the 0.000 significance level. Which, if we accept the 5% significance level generally accepted in the social sciences, shows a significant relationship between the two variables. The strength of the relationship is 0.313 and 0.299, respectively, based on the Cramer V and contingency coefficients, i.e., the existence of a weaker to moderate relationship.

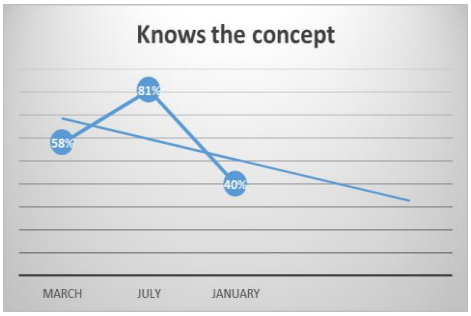

Figure 3
Knowledge of the concept of zero-waste among respondents
Source: Own editing based on Benita Szalay's data collection

We continued our analysis by exploring whether those with higher education or urban residents really have a broader knowledge of this factor of environmentally conscious consumer behavior. The results obtained in the breakdown of the queries are summarized in the following table.

Table 1

Knowledge of the concept of zero-waste in the light of educational attainment

	Elementary	Secondary skilled worker	High school graduation	Higher education	Chi square	sign.	Cramer V	contingency coefficient
March	4%	9%	31%	56%	26.858	0.000	0.335	0.317
July	4%	3%	38%	55%	15.392	0.002	0.307	0.294
January	3%	12%	38%	47%	6.494	0.090		

Source: Own editing based on Benita Szalay's data collection

It can be clearly seen from the table above that, regardless of the time of the survey, we always see an increase between the knowledge of the concept of zero-waste and higher levels of education. To support this part of our hypothesis statistically, we performed the Chi-square test examining the relationship between the two nominal variables, which showed a significant correlation between the educational attainment and the knowledge of the concept in the three queries at a significance level of 5%. Using the indicators already used above, a weaker than medium relationship can be detected for the strength of the existing statistical relationship. In the light of the statistical tests performed, we can state that we accept this part of our hypothesis, that is, that respondents with higher education are really at the forefront of knowing the concept of zero-waste.

In the following case study, we also examined the knowledge of the concept depending on the place of residence. In this case, it is outlined in the first two surveys, and this is supported by statistical studies of the wider prevalence of knowledge of the concept among urban respondents. Both the March and January data show a significant, moderate to weaker relationship between the two variables examined. We also accept this part of our hypothesis. The results of the statistical tests are summarized in Table 2, below.

Table 2

Knowledge of the concept of zero-waste in the light of the place of residence of the respondents

	Village	City	Chi-square	sign.	Cramer V	Contingency coefficient
March	36%	64%	25.854	0.000	0.328	0.312
July	35%	65%	9.17	0.002	0.237	0.231
January	65%	35%	0.37	0.543		

Source: Own editing based on Benita Szalay's data collection

In light of the statistical analyzes conducted above, our first hypothesis is:

"More and more people are familiar with the concept of zero-waste, is led by those with higher education and urban residents."

We can accept it with modifications, i.e. based on our survey, fewer and fewer people are familiar with the concept of zero-waste and this trend seems to continue, but among respondents with conceptual knowledge, respondents with higher education and urban residence are indeed at the forefront. In the future, therefore, it would be useful to make further efforts to promote a waste-free lifestyle, mainly among the less educated and the rural population, through awareness-raising campaigns.

In the following, we turn to the examination of our second hypothesis, which sounded as follows:

H2: In the zero-waste business, the group of customers most likely to be dominated by customers with a higher education who pay attention to the environmentally friendly packaging of the product. And over time, more and more people would be willing to buy into this type of business.

In our first step we examine the second half of our hypothesis. At the time of each query, we filter out in chronological order our respondents who would be willing to shop in a store that follows a zero-waste philosophy. In addition, we would like to note that during the questionnaire, the respondents already found a specific description of what the concept of zero-waste means, movement. In the light of the knowledge, they were able to answer our question as to whether, if they had the opportunity, they would be willing to buy in a store that operates in the spirit of zero-waste.

Figure 4
Willingness to shop in a Zero-waste type store among respondents
Source: Own editing based on Benita Szalay's data collection

Based on the figure above, we can state that the majority of our respondents showed a willingness to shop in a zero-waste store most of the time. However, drawing a trend line, our forecast for the future is not very encouraging, as a declining trend line emerges in the figure. As a result of this first analysis of our hypothesis, we cannot be optimistic about the future, i.e., further efforts would be needed to make customers increasingly open to outlets selling fully environmentally friendly products. Next, at a significance level of 5%, we examined whether there was a relationship between the time of the query and the willingness to shop at the zero-waste store. As a result of our statistical analysis, the value of the Chi-square is 23.300 at the significance level of 0.000, i.e. a significant relationship can be detected between the two variables examined above. The values of the Cramer V and Contingency coefficients are 0.208 and 0.203, respectively, which show a weaker to moderate relationship between our variables. We reject the second half of our hypothesis in the light of the above analyzes, i.e. although there is a relationship between time and shopping in an eco-friendly business, this trend unfortunately does not show an increasing trend for us.

Next, we turn to the analysis of the first half of our hypothesis. That is, we examine whether there is a correlation between marital status, educational attainment, openness to environmentally friendly packaging, and willingness to shop in a zero-waste store. In this case, we first analyzed the willingness to buy in the zero-waste store as an independent factor and the disposition of the child as a dependent variable.

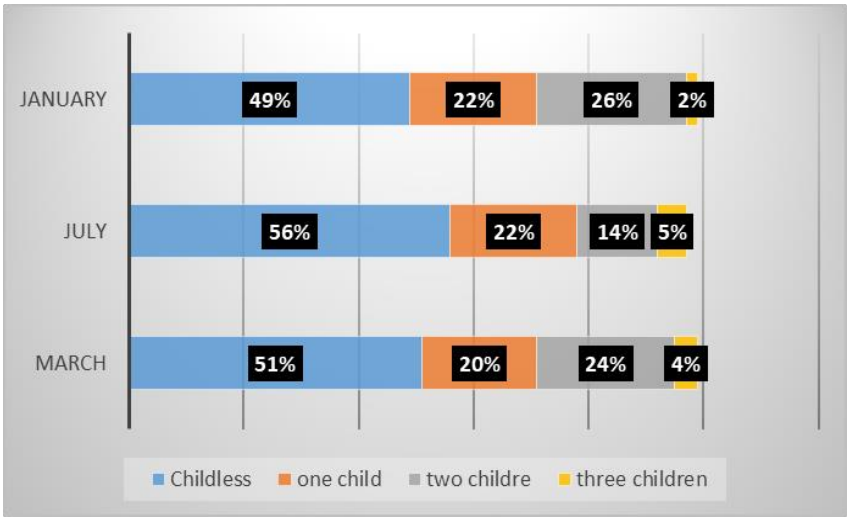

Figure 5
Willingness to buy in a zero-waste store in light of the marital status of the respondents
Source: Own editing based on Benita Szalay's data collection

Based on the figure above, we can state that half of our respondents (51%-56%-49%) who would be willing to buy in a zero-waste spirit store in the future for each query are childless, the other half of the sample is group of people with children. Performing in-depth analyzes, our Chi-square index shows a significant result with only one, at the 5% significance level in the March survey, with the presence or non-availability of the child and the purchase in the store following the non-packaging principle. At the March survey, our Chi-square value was 9.561 at the significance level of 0.049. The Cramer V and Contingency coefficient values are 0.201 and 0.197, which show a moderate to weak relationship between the variables described above. Thus, having performed the bivariate analyzes, this part of our hypothesis that those with children dominate the purchase in the zero-waste store is hereby rejected.

The next part of our hypothesis assesses the relationship between educational attainment and willingness to buy. As can be seen in the figure below, the willingness to buy in a zero-waste store increased with almost all queries as a function of educational attainment. Thus, this part of our hypothesis that those with higher education dominate in terms of openness to shopping in an environmentally friendly store seems to be correct.

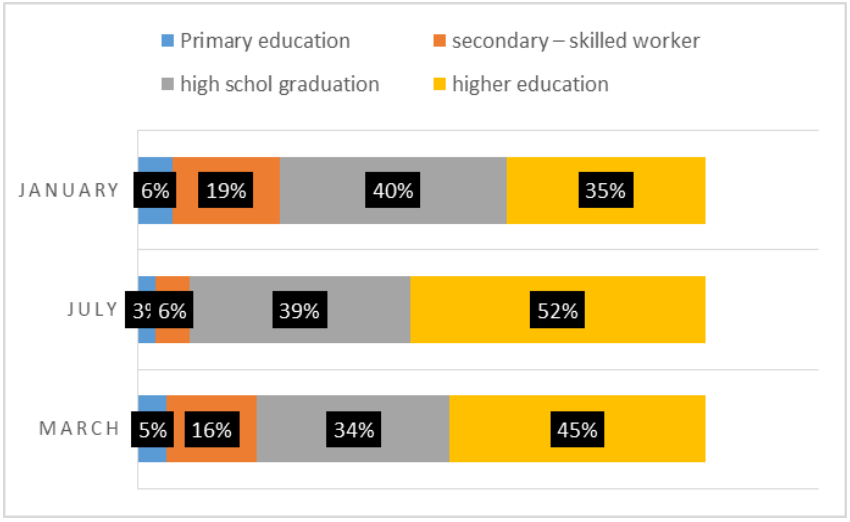

Figure 6
Examining the relationship between willingness to shop in a zero-waste store and educational attainment
Source: Own editing based on Benita Szalay's data collection

As a result of the cross-tabulation analyzes, we also examined whether there was a significant relationship between educational attainment and openness to shopping in a zero-waste store. At the time of our queries, the value of our chi-square in chronological order: 1.611 at the significance level of 0.657, 0.752 at the

significance level of 0.861, and 2.558 at the significance level of 0.465. Based on the above, at a significance level of 5%, no significant relationship can be detected between education and willingness to shop in the zero-waste business, so we reject this part of our hypothesis.

In the following, we also examined whether those who pay attention to the eco-friendly packaging of their products are more open to buying at a point of sale specifically with eco-friendly packaging for in-store shopping. In two surveys, in March and January, we found that 56% and 63% of our respondents, who are open to shopping in the zero-waste store, unfortunately do not pay attention to the environmentally friendly packaging of their products. Only in the July survey were the majority (57%) of our respondents who were also open to shopping in the eco-friendly store and also paid attention to the eco-friendly packaging of the product during their purchases. Based on these, therefore, this part of our hypothesis also seems to be overturned. To state this with certainty, we also performed statistical tests, the results of which are summarized in the table below.

Table 3

Openness to shopping and paying attention to eco-friendly packaging is a test of the Chi-square

	Chi-square	Sign.
March	2.728	0.099
July	3.816	0.051
January	14.481	0.000

Source: Own editing based on Benita Szalay's data collection

It can be clearly seen from the above table that at a significance level of 5%, a significant relationship between paying attention to environmentally friendly packaging and shopping at a zero-waste point of sale can only be detected during the January survey. Since this is a 2x2 table, we chose the Phi coefficient to examine the strength of the relationship, the value of which in this case is 0.319, which shows a weaker than average relationship between the studied variables. As a result of the above analyzes, therefore, we can indeed reject this part of our hypothesis.

Our Hypothesis 2 outlined above, evaluated from several perspectives, states: ***"In the zero-waste business, the group of customers most likely to be dominated by shoppers with a higher education who pay attention to the environmentally friendly packaging of the product. And over time, more and more people would be willing to buy in this type of business."*** we reject it in its entirety. We did not find a significant correlation between individuals' marital status, education, and their attention to environmentally friendly packaging and shopping in a zero-waste store. In the same way, although there is a significant relationship between the time of the survey and the willingness to buy, the trend is unfortunately not positive, which we can in no way find encouraging from an environmental point of view.

In the following, we also describe the selective waste collection habits of Slovak households. Slovakia is proving to be a relatively green country compared to the rest of the world. According to the biennial EPI surveys, the 13 greenest states will be ranked 13th in 2010, 12th in 2012, 21st in 2014, 24th in 2016, 28th in 2018, and 26th in 2020. [11] Between 2010 and 2013, an average of 9.5 million tons of waste was generated in Slovakia each year. In 2013, with a waste production of 304 kg / person, we became the 4th least municipal waste-producing member of the European Union. According to statistics from 2010 to 2013, almost 5 million tons of waste are "disposed of" by storage each year, which is almost 50% of the waste extracted each year. With energy-free combustion, approx. 55 thousand tons, with incineration for energy production approx. 300,000 tons of garbage was incinerated. Although 30 percent of the mined waste was recycled in 2013, it is still 0.5 million tons less than in previous years. Of this, the highest share (36%) was generated by construction and demolition waste. Also, according to statistical surveys conducted between 2010 and 2013, in 2013 the majority of municipal waste was generated in the districts of Bratislava and Trnava, which exceeded 400 kg / person per year. The district of Nitra was in third place, where more than 350 kg / person of garbage was produced. In the municipal waste survey in 2013, we found out that 40.32% is glass, 35.22% is paper, 19.21% is plastic, 15.50% is biodegradable and the rest is mixed material waste. [26]

In our studies, we separately assessed the main types of waste, including plastic, paper, glass, clothing, bio-waste, composting, batteries, repair of damaged electrical equipment, and their disposal in the economic courtyard. Our research results are illustrated in the following figure.

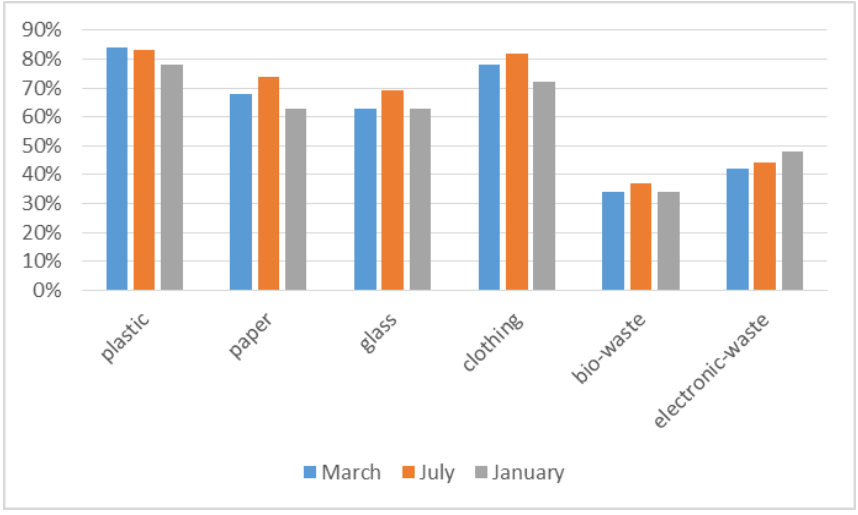

Figure 7
Separate waste collection habits of Slovak households
Source: Own editing based on Benita Szalay's data collection

Based on the above figure, we can state that Slovak households pay the most attention to the selective collection of plastic and used clothing. Least of all, to the selection of biological and electrical waste that is part of their daily lives. In the case of all queries, we obtained the same ratios for each type of waste, i.e. neither improvement nor deterioration was observed among Slovak households. The country is just starting to pay attention to the selection of bio-waste, and each household has been given separate storage boxes in order to encourage them to be selective. We therefore hope that, as a result of these measures, residents who pay even less attention to bio-waste selection will be as active in collecting bio-waste separately in a few years as they are in the case of plastic waste, for example.

Conclusions

A drastic transformation of social structures and values has been observed in recent decades. However, at the same time, we may face the almost, complete disappearance, of moral issues and general morality. The example of illegal dumping is an excellent illustration of the indifference of our immoral society, to our environment and thus, to our own health. Although conferences, conventions, laws and actions, have sought to recognize the dangers posed by man in the modern or postmodern age, global environmental problems, such as waste, are also present. [27]

As a result of our multiple cross-sectional research, we can state, as several researchers have done before us, that the success of the introduction of an efficient waste management system depends primarily on the individual. If the individual feels that it is a personal matter to preserve the cleanliness of his environment, to apply the possibilities provided by selective waste collection and the use of the waste yard, then he or she becomes more and more open towards the zero-waste spirit we are examining. Although our results are not very encouraging in this regard, as over time neither the knowledge of the concept among the respondents, nor the willingness to shop in stores operating in the examined spirit, showed an increasing trend, we are still optimistic. We hope that the zero-waste spirit can be transferred to the population through extensive environmentally conscious communication campaigns and, last but not least, environmental education. However, in order to transfer knowledge effectively, these activities may not be occasional. In order to achieve the development of an environmentally conscious way of life for all ages, the development of environmental education and vocational training is an important national and global task. This applies both to traditional education and to education through the media and other means. However, the research of Monostori-Hőrich [20] drew attention to an enormously thought-provoking fact; namely, that environmental legislation and investments do not always support the population, so although their implementation is based on a social consensus, all the details (costs and use - the final links in the system), are not fully accepted by consumers. Changing the above realities should encourage further efforts by our social and governmental leaders.

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