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SOCIAL MARKETING AS A TOOL FOR A SUSTAINABLE MUNICIPAL WASTE MANAGEMENT

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Abstract

Research purpose. The purpose is to study the household attitudes toward waste separation and prevention and present an innovative model of efficient and sustainable waste management.

Design / Methodology / Approach. In the empirical part, an online survey was implemented to research residents' attitudes and intentions regarding handling household waste. It resulted in 228 valid responses, used for a quantitative analysis to answer the set hypotheses.

Findings. Regardless of the good results of waste separation in the municipality, the research showed that households do not know how to classify certain waste according to the type properly. It was confirmed that the use of penalty programs does not contribute to a higher level of waste separation. The already high awareness of the importance of separating waste could further be strengthened through the tools of social marketing as a factor for social change.

Originality / Value / Practical implications. It has been proven that residents' motivation is an important factor that indirectly influences households to separate, prevent and reduce the generation of new amounts of waste. Changing people's attitudes, mindsets, and behavior to be environmentally friendly is the best way to prevent further encroachment on the natural environment.

Keywords: social marketing; environmental awareness; motivation; waste reduction; households.

JEL codes: M31

Introduction

Criticism of the throwaway society influenced by consumerism (Gregson et al., 2007) and disposable culture (Adkins, 2018) is growing into an ever-stronger movement that tries to change how an average consumer thinks and acts. The consumption of non-recycled materials is growing, and the lifespan of products is shortened; if we add the accelerated development of industry, we come to the conclusion that these factors cause increased use of natural resources and growth of waste all over the world. If customers want to change their consumer habits, they need to know where and how to buy environmentally friendly products. As a link between buyers and producers, retailers have a great power to raise awareness and thus influence the choice when buying these products on their shelves (European Commission 2009, 13). Čebular Zajec (2015, 44) states that industry in Europe faces four main challenges: excessive waste and low material efficiency, rising raw material prices, the cost structure of production, where material costs of companies account for almost half of all costs, and high the EU's import dependence on raw materials and energy. The Sustainable Development Goals have been set up by the UN and represent a collection of 17 interlinked global goals for a "blueprint to achieve a better and more sustainable future for all", with goals 11 and 12 tackling waste and waste management and planned to be achieved by 2030 (United Nations, 2015). The critique of traditional waste systems and the direction of seeking new alternatives was pioneered by the community and environmental movements. The solutions for these problems could be found, for example, in the transition to a circular

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economy, where waste from one industry becomes a raw material for the same or another industry (Morseletto, 2020). The reasons for promoting the circular economy are not just environmental. Namely, it is also about achieving economic and social goals in the form of new, quality employment. Another influential movement is building around the zero-waste idea in future cities (Hannon & Zaman, 2018). The world is facing a critical point where it is necessary to rethink how to improve sanitation by achieving sustainable development goals for the present and future generations (Orner & Mihelčič, 2018).

Literature review

The challenge is great, all parties involved will have to contribute a significant share to achieve the goal. On the one hand, the state, as a promoter of the idea of a circular economy and a policy of promoting recycling and waste prevention, and also municipalities through their public service providers to establish an effective way of waste separation, promotion, awareness, and appropriate infrastructure for their treatment, and finally households with the original task of proper waste separation and, above all, the orientation towards their prevention. This means changing consumer behavior in terms of quality-of-life orientation, reducing unnecessary purchases, choosing durable products with less harmful substances and, rejecting advertising materials, purchasing beverages, food and detergents in returnable packaging. Ottman (2011) emphasizes that the basic rule of green consumer consumption is control over a world that is becoming increasingly uncontrolled. He mentions sustainable consumers as people who care about their health and the health of relatives. They are taking control of the market, researching products, their packaging, and ingredients with a vengeful attitude, and in addition to directing their attention to the reputation of producers for eco (green) and social responsibility, the author adds (ibid.). Eagle, Dahl and Low (2020, 193) define social marketing as social change marketing. Like commercial marketing, social marketing seeks to change the behavior of target groups, with the difference that commercial marketing does so to increase market share, sales and consequently profits, while social marketing changes the behavior of individuals solely for the benefit of society as a whole.

Cornia et al. (2020) believe that separating waste alone is not enough to achieve environmental goals if we continue to promote separation. Attention must also be paid to preventing waste at the source, preparation for reuse, recycling, and energy conversion into fuels. Waste disposal is the last option in this cycle. Ekart & Vovk (2013) warn that non-implementation of comprehensive waste management will not bring Slovenia the title of "recycling society", especially because after 2020, waste disposal is not expected to be subject to waste management. Whether the turnaround in mentality will succeed, time will tell. In this paper, we want to present the issue of attitudes towards the separation and prevention of household waste in the municipality of Celje.

A common definition of waste across the Member States is presented by the Waste Framework Directive as "any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard" (EU, Regional Environmental Center, n.d.). Waste has been divided into different categories in the literature: municipal, industrial, hazardous and special. In terms of functionality and processing by material composition into biological waste, paper, glass, plastic, metals, composite materials, ..., according to the activity into waste from primary activity (agriculture, forestry, mining, …), waste from industry, energy, and construction waste. According to the method of its management and according to the possibility of reuse (Regional Environmental Center, n.d.).

Table 1. Overview of waste flow in Slovenia (Source: SORS, 2021)

Slovenia 2020	waste (t)
Non-hazardous and hazardous waste generated – total	7,669,111
Hazardous waste generated – total	138,296
Municipal waste generated	1.026.010
Hazardous municipal waste generated	7,376
Separately collected municipal waste	741,139

Waste recycling – total	3,193,220
... of which composting and treatment in biogas plants	301,332

The legislative basis in the field of waste management in the area of waste management is mostly based on the Environmental Protection Act. The framework or basic regulation governing waste is the Rules on the Management of Waste. These rules are supplemented by three subsidiary groups of regulations (ARSO, 2022):

- the first group comprises regulations governing individual types of waste (e.g. management of waste oils, packaging and packaging waste, batteries), and
- the second group comprises regulations governing facilities and equipment for waste management (disposal and incineration of waste).
- the third group consists of regulations on the transboundary shipment of waste.

Waste management (or waste disposal) deals with the processes and activities needed to manage waste from the starting point to its final disposal. Under the term of the circular economy, additional effort must be made to acquire the most updated information and pave a sustainable path for the management of municipal solid waste (Tsui & Wong, 2019). Esmaeilian et al. (2018) offer an insight into the potential of smart cities and connected communities in facilitating waste management efforts. Their framework highlights the value of product lifecycle data in reducing waste and enhancing waste recovery and the need for connecting waste management practices to the whole product lifecycle. In comparison, zero waste is understood as the design and management of products and processes, the reduction of the volume and toxicity of waste, and the preservation and recovery of all materials that are not incinerated or disposed of.

So, it is clear that pursuing waste prevention deploys different strategies and offers numerous benefits. Waste prevention might be accomplished through the reduction of the amount of materials that are being used in the products' production and through the increase of the products' efficiency. It can be pursued through the limitation of the excess consumption and by using products which would bring less waste. And finally, waste prevention is about consumers' attitudes and intentions to consider the possibility of reuse, repair or renovation before disposal (FoE Japan, 2013).

To achieve such a shift that would realize in the move from recycling to reduction while pursuing the way to sustainable consumption, some conditions must be established. If recycling depends only on the market, it might finish circulating due to the progressive economic development, as the income from the collection of recyclable resources lowers comparatively, and because the public sensitivity and awareness improves. This is why it is needed to control and reduce waste generation. With the implementation of waste reduction measures, it could be anticipated a reduced burden on waste management (FoE Japan, 2013).

There are diverse theories and models of behavior change, but in order to significantly influence and change residents' behavior in the field of waste reduction, the literature review brings considerable evidence that it is wise to use social marketing (Cole & Fieselman, 2013; Hodgkins et al., 2019; Kim et al., 2019; Kim et al., 2020; McKenzie-Mohr, 2011; Pearson & Perera, 2018). The goal of social marketing is to change harmful or useless behavior. Four types of social changes are being influenced through social marketing:

- Cognitive changes: raise awareness and educate individuals.
- Action changes or encouragement for action: attract as many individuals or target groups as possible to decide on a specific activity within a certain time frame.
- Behavior changes: require people to give up certain activities and adopt a different way of behaving that is in their best interest.
- Changes in values: the individual is required to change deep-rooted beliefs.

The City Municipality of Celje is one of twelve city municipalities in Slovenia. Its seat is the city of Celje, a regional center of southern Styria. It is the third-largest city in Slovenia. The Celje Regional Waste Management Center project (hereinafter RCERO Celje) is the first such integrated waste management project in Slovenia and represents the most significant environmental investment in the Municipality of Celje and the other 23 municipalities of the Savinjska region. The reason for the construction of RCERO Celje was the fact that the old landfills were no longer in accordance with the EU Directive on landfills because the limited space of landfills did not allow further disposal of waste. With the construction of the center alone, approximately 250,000 people from the region have gained the opportunity to be included in a comprehensive waste management system for the next five decades (Simbio, 2014).

Simbio, d. o. o., has 322 ecological islands in the area of the Municipality of Celje, where there are two or three containers of 1800 litres each, in which glass, plastic and metal packaging and paper and cardboard are collected. For the collection of hazardous waste, the company has a mobile collection point for hazardous waste, where it is placed in a certain place after the prior announcement; otherwise, the possibility of delivering waste to collection centers in the region (this only does not apply to mixed municipal waste). A similar system is for bulky waste, except the company pre-orders metal containers of 5 to 30 cubic meters or removes bulky waste on the basis of an order form, where each household can benefit from the disposal of up to 1 m^3 of such waste per year). There are 28,003 collection points in the Celje region, of which the most in Celje are 8,620 (Simbio, 2017).

Empirical analysis

The questionnaire was prepared about residents' attitudes toward waste separation and reduction, developed on the basis of the previous studies and literature review. It has been pretested in a pilot survey. Cronbach's coefficient α was used to check the reliability and validity of the questionnaire; it was measured at $\alpha = 0.794$, which is a good result. The data collected in the online survey were used for the purposes of their analysis using various statistical methods, using SPSS and LISREL programs. Methods used for testing hypotheses and modelling: exploratory factor analysis with Varimax rotation and Kaiser normalization; regression analysis; Spearman and Pearson correlation coefficients; and SEM analysis.

The survey questionnaire was sent to more than 1000 different e-mail addresses from the company's database; twice it was published on the social network Facebook and once on the social network LinkedIn. The effort resulted in 256 completed questionnaires, of which 205 respondents (80%) completed all questions, and the remaining 51 (20%) completed the questionnaire after the first question. There were 228 (89%) partially completed and, at the same time, relevant questionnaires.

Testing the hypotheses

Hypothesis 1: The more regulated the waste infrastructure, the more consistent the waste separation (at the declarative level). This hypothesis was tested with the help of regression analysis, where we checked the impact of waste infrastructure (independent variable) on the consistency of waste separation (dependent variable), which we obtained as a result of factor analysis. Based on the result of the regression analysis, we find that with the help of waste infrastructure, we can explain 3.9% of the variability of consistent waste separation, which indicates the fact that the dependent variable is significantly influenced by other factors. The data are shown in Table 2.

Table 2. Summary of the regression model of the variable "Waste infrastructure" (Source: authors)

Model Summary				
Model	R	R^2	Adjusted R^2	SD
1	0.206[a]	0.042	0.039	0.91268966

a. Predictors: (Constant), Waste infrastructure

The validity of the linear model was checked using variance analysis (ANOVA). The regression model is statistically significant (F = 11.313, p = 0.01 <0.05). The results are shown in Annex 4. From Table 3, we can see that the value of the standardized regression coefficient for waste infrastructure is 0.206 and is statistically significant (p = 0.001), which means that waste infrastructure has a positive and statistical effect on the consistency of separation. Although there is a weak dependence of the consistency of separation on waste infrastructure, we, nevertheless, confirm hypothesis H1.

Table 3. Coefficients of linear regression analysis - dependent variable "Consistency of waste separation", an independent variable "Waste infrastructure" (Source: authors)

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	SD	Beta		
Constant	-2.217E16	0.057		0.000	1.000
Waste infrastructure	0.209	0.062	0.206	3.363	0.001

a. Dependent variable: Consistency of waste separation

Hypothesis 2: The level of knowledge of waste separation is positively related to consistent waste separation. To test the second hypothesis, we used Spearman's correlation coefficient (one of the variables is ordinal) because we wanted to determine whether there are relationships between the dimensions of waste separation consistency and the new calculated variables of knowledge of waste separation. Before calculating the correlation coefficients, it was first necessary to design a newly derived variable knowledge of correct separation. This variable was formed into three levels: 1 - low level, 2 - medium level and 3 - high level of knowledge of separation. We did this by considering the answers to the four questions asked (Q14 to Q17) from the questionnaire survey. For the correctness of the answers above 80%, they were classified as a high level of knowledge, for the correctness of the answers between 40 and 80%, they were classified as a medium level of knowledge, and below 40% of the correct answers as a low level of knowledge. Table 33 shows that all correlation coefficients are statistically insignificant. The p values of the dimensions of the consistency of waste separation are more than 0.05, so we cannot discuss the relationship between variables, resulting in the rejection of hypothesis H2.

Table 4. Spearman's correlation coefficient between the dimensions Separation Consistency and Knowledge of Waste Separation (Source: authors)

			Knowledge of Waste Separation
Spearmans' rho	Mixed municipal waste	Correlation coefficient	-0.096
		Sig. (2-tailed)	0.125
		N	257
	Biological waste	Correlation coefficient	0.009
		Sig. (2-tailed)	0.887
		N	257
	Plastic and metal packaging	Correlation coefficient	-0.060
		Sig. (2-tailed)	0.340
		N	257
	Paper and cardboard	Correlation coefficient	-0.073

	Sig. (2-tailed)	0.243
	N	257
Glass	Correlation coefficient	-0.043
	Sig. (2-tailed)	0.495
	N	257
Hazardous waste (batteries, medicines, paints, chemicals, etc.)	Correlation coefficient	-0.015
	Sig. (2-tailed)	0.807
	N	257
Bulky waste	Correlation coefficient	-0.017
	Sig. (2-tailed)	0.783
	N	257
Knowledge of separation	Correlation coefficient	1.000
	Sig. (2-tailed)	
	N	360

Hypothesis 3: Motivation in the form of reward and punishment has a positive effect on more consistent waste separation (at the declarative level).

It was tested with the help of regression analysis, where we tested a linear sample relationship between a dependent variable and two independent variables. For the purposes of hypothesis testing, the dependent variable in the regression analysis was the consistency of separation, while the variable consistency of separation due to monetary rewards and penalties was included as independent, and the consistency of separation due to collection charges was the second variable. All these variables were obtained based on the results of factor analysis. Based on the results of the regression analysis, we find that only 1.7% of the variability of consistent waste separation can be explained by the consistency of separation due to collection charges and the consistency of waste separation due to monetary rewards and penalties, which indicates that the dependent variable is significantly influenced by other factors. The data are shown in Table 5.

Table 5. Summary of the regression model of the variables "Consistency of separation due to removal charges" and "Consistency of separation due to monetary rewards and penalties" (Source: authors)

Model Summary				
Model	R	R^2	adjusted R^2	SD
1	0.160[a]	0.026	0.017	0.88928152

a. Predictors: (Constant), consistency of separation due to collection charges, consistency of separation due to monetary rewards and penalties

The validity of the linear model was checked using variance analysis (ANOVA). The regression model is statistically significant ($F = 3.089$, $p = 0.047 < 0.05$). The assumption of the presence of multicollinearity in the regression model was checked using the VIF factor. The latter is not present if its value is less than 10.

Table 6 shows that the value of the VIF factor is 1,001 for both variables. This confirms the absence of multicollinearity. From Table 6, we can see that the value of the standardized regression coefficient for consistency of separation due to rewards and penalties is -0.136 and is statistically significant (p =

0.036), while the value of the standardized regression coefficient for consistency of separation due to removal charges is -0.082 and not statistically significant (p = 0.206). This means that the consistency of waste separation is not affected by the consistency of separation due to charging. The consistency of separation due to rewards and penalties negatively and statistically affects the consistency of waste separation, which means that hypothesis H3 cannot be confirmed.

Table 6. Coefficients of linear regression analysis - dependent variable "Consistency of waste separation", independent variables "Consistency of separation due to monetary rewards and penalties", and "Consistency of separation due to collection charges" (Source: authors)

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.	Colinearity	
	B	SD	Beta			Tolerance	VIF
Constant	0.032	0.058		0.558	0.578		
Consistency of separation due to monetary rewards and penalties	-0.128	0.061	-0.136	-2.109	0.036	0.999	1.001
Consistency of separation due to collection charges	-0.075	0.059	-0.082	-1.267	0.206	0.999	1.001

a. Dependent variable: Consistency of waste separation

Hypothesis 4: The level of knowledge of the waste separation and prevention system has a positive effect on consumers' shopping habits. The mentioned hypothesis was tested with the help of regression analysis, where we tested a linear sample relationship between the dependent variable and three independent variables. For the purposes of hypothesis testing, the regression analysis was a dependent variable of the purchasing habit variable; the independent variable was the pay-as-you-go variable, the permanent variable was waste reduction and the third variable of waste management. All these variables were obtained based on the results of factor analysis. Based on the result of the regression analysis, we find that with the help of the system "pay as you put off", permanent waste reduction and waste management, we can explain 20.9% of the variability in shopping habits, which indicates that the dependent variable is significantly influenced by other factors. The data are shown in Table 7.

Table 7. Summary of the regression model of the variables "Pay as you litter", "Sustainable waste reduction", and "Waste management" (Source: authors)

Model Summary				
Model	R	R^2	Adjusted R^2	SD
1	0.469[a]	0.220	0.209	0.85771245

a. Predictors: (Constant), Pay as you litter system, Permanent waste reduction, Waste management

The validity of the linear model was checked using variance analysis (ANOVA). The regression model is statistically significant (F = 21.047, p = 0.00 <0.05). The assumption of the presence of multicollinearity in the regression model was checked using the VIF factor. The latter is not present if its value is less than 10. Table 37 shows that the values of the VIF factor are less than 10 for all variables. This confirms the absence of multicollinearity. From Table 8, we can see that the value of the standardized regression coefficient for waste management is 0.430 and is statistically significant (p = 0.00). The standardized coefficient for permanent waste reduction is 0.170 and is also statistically

significant (p = 0.004), while the value of the standardized regression coefficient for the pay-as-you-go system is 0.016 and not statistically significant (p = 0.799). This means that shopping habits are not affected by the pay-as-you-go system. Waste management and permanent waste reduction have a positive and statistically significant effect on shopping habits, which means that hypothesis H4 is partially confirmed.

Table 8. Coefficients of linear regression analysis - dependent variable "Purchasing habits", independent variables "Waste management", "Permanent waste reduction" and "Pay as you go" system (Source: authors)

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.	Collinearity	
	B	SD	Beta			Tolerance	VIF
Constant	0.017	0.057		0.307	0.759		
Waste management	0.487	0.069	0.430	7.024	0.000	0.928	1.078
Permanent waste reduction	0.193	0.067	0.170	2.872	0.004	0.998	1.002
Pay as you litter system	0.020	0.078	0.016	0.255	0.799	0.927	1.079

a. Odvisna spremenljivka: Nakupne navade

Presentation and verification of the structural model

The SEM analysis represents the analysis of the structural model. It analyses relationships or relations between model constructs or sets of variables. In the process of testing the structural model, it is a matter of testing hypotheses about the connections between individual constructs or concepts by checking the whole model. The starting point for testing hypotheses is the comparison of hypothetical (theory-based) relationships with those measured on the basis of empirical data. In our case, based on theoretical starting points and personal assumptions, we presented the relationships or relations between individual sets of variables and performed a simpler SEM model, as we had already performed an extensive analysis in the previous phase. In order to observe the relationships between individual sets of variables, we designed the structural model so that we can observe the direct impact of four sets of variables (perception of waste separation, motivation in the form of rewards and penalties, waste infrastructure, level of knowledge of waste prevention) on the consistency of waste separation. Sets of variables (level of knowledge of waste separation, perception of waste separation) on purchasing habits and the indirect influence of the level of knowledge of waste separation through the perception of waste separation on the consistency of waste separation. In the model, individual sets of variables are calculated based on the sum of all statements of each set of questions, using two sets of questions, namely Q10 and Q11, to perceive waste separation. The model shows individual connections and represents relationships or relations (in the form of an arrow) between independent and dependent sets of variables. The direction of the arrow indicates a direct relationship between sets of variables (independent to dependent). These are partial regression coefficients that show the strength and direction of the connections between the mentioned variables.

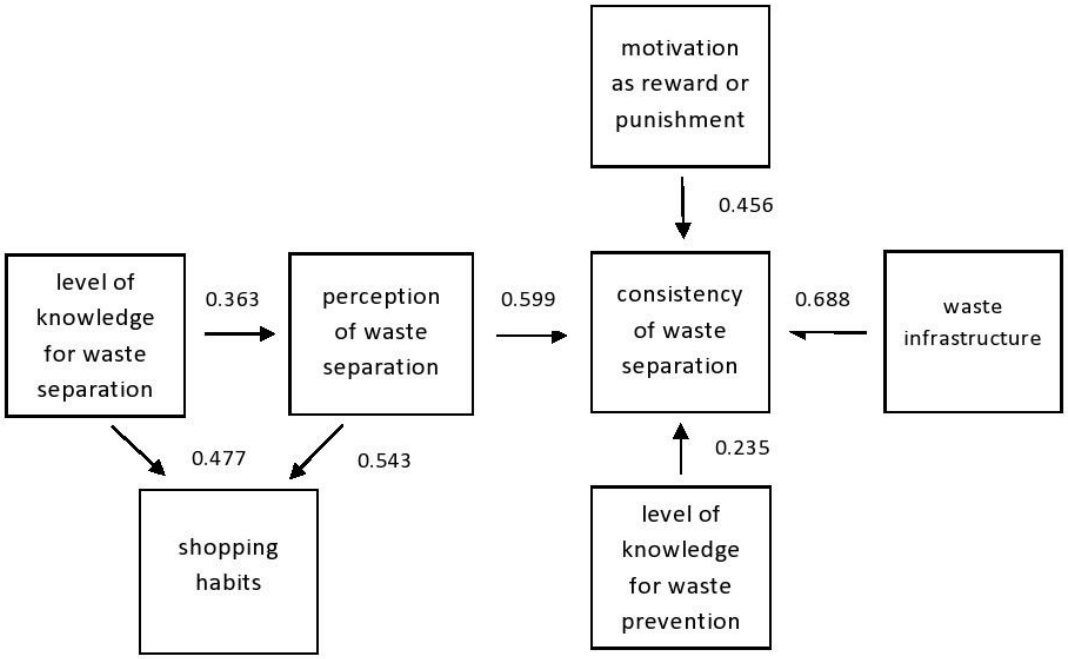


Figure 1. Structural model of sets of variables (Source: authors)

Figure 1 shows that "waste infrastructure" (0.688) and "waste separation perception" (0.599) have the greatest impact on the consistency of waste separation, less "reward motivation" (0.456) and "waste prevention knowledge level" (0.235).). Based on the obtained results, we can say that they are expected because waste separation requires good infrastructure to enable the consistent separation, and it is also important how households perceive or are susceptible to waste separation. The susceptibility of separation, of course, requires motivation, which can take the form of a reward or a fine. "Perception of waste separation" has a slightly greater impact on purchasing habits (0.543) than the "level of knowledge of waste" (0.477). The reason for this result is our assumption that households that are more susceptible to segregation are consequently also more environmentally aware and thus buy products that are environmentally friendly and cause less waste.

Discussion and Conclusions

Findings regarding the waste separation show that households are aware of the importance of separating waste, which means reusing raw materials, conserving natural resources and thus the environment for future generations. All households generally separate waste; on average (M = 4.23), households accurately (61-80%) separate all types of waste, mainly the waste collected on ecological islands, namely paper, plastic and metal packaging and glass. They are not so precise in separating hazardous waste. The reason for this lies in the fact that households do not have special containers for the mentioned waste but have to take the waste to the collection center.

Findings regarding the motivation for waste separation demonstrate that motivation in the form of a reward or a sanction with a fine are not factors that would further encourage households to separate waste, as they are undecided about this type of incentive. Even the method of charging for collection, "you pay as much as you litter," is not a good enough monetary incentive. This means that separation is influenced by other motivational factors not covered by the research. The motivational factor in the form of a one-month write-off of the amount for the waste collection came closest to the average of approvals (M = 3.33).

Findings regarding waste reduction and prevention prove that most households occasionally pay attention to the fact that their purchases do not cause additional unnecessary packaging, which increases the generation of new waste. More and more households are realizing the importance of buying environmentally friendly products. Half of all respondents buy the same share of conventional and green

(eco) products. From the results of the analysis, we found that, on average, respondents pay the most attention to products that are fresh and unpackaged (M = 3.81) and made from natural ingredients (M = 3.55). On average, households agree that the conservation of natural resources is a necessity and not a choice (M = 4.57).

The awareness of the importance of separating waste (environmentally friendly behavior) for the preservation of the environment and thus natural resources is also felt by households in the municipality of Celje. The survey found that, on average, households strongly agree with the claims that dictate the importance of segregation for environmental conservation for future generations and the possibility of recycling and reusing raw materials from waste to conserve natural resources. Not only are they aware of the importance of waste separation, households in the municipality actually separate waste in a very efficient way. Motivation is an essential factor that indirectly influences households to separate, prevent and reduce the generation of new amounts of waste.

This is possible if we use social marketing as a tool that influences the target audience in order to positively change behavior concerning the environment. A social marketing plan must be developed based on proper analysis, selecting target groups, setting behavioral goals and tasks, identifying barriers and benefits for target groups, develop appropriate positioning and marketing mix elements.

Despite the fact that the "Zero waste" strategy is not implemented in the municipality where the survey was conducted, we concluded that households are in favour of some claims related to the strategy. On average, households agree that the conservation of natural resources is a necessity and not a choice. As households separate waste well, it was to be expected that, on average, they still agree with the statement that it is necessary to separate all types of waste. On average, they least agree with the statement that the municipality does not need a landfill and incinerator. One of the reasons is that the municipality has built an incinerator that supplies the city with heat produced from waste incineration. The survey also showed that households are aware that in order to preserve natural resources, it is necessary not only to separate but also to prevent the generation of new waste. In prevention, they are especially active in the consumption of paper that is printed, photocopied and written on both sides, and in shopping, where they use the already used bag they bring from home.

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