Environmental Awareness and its Influence on Household Consumption of Goods

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Abstract. The thesis was aimed at investigation of the level of environmental awareness of consumers in the Slovak Republic and its influence on household consumption, production and treatment of household waste. The survey examined the average amount of separated household waste, the average food costs, the level of environmental awareness, the possibilities to separate waste in a household or nearby and other features. The results of the investigation revealed that the average amount of separated waste in a household was just about 50%, despite of the fact that consumers had possibilities for separation in their household. There were used eligible mathematical and statistical methods and the hypothesis testing that confirmed differences between the estimated rate of recycled waste in Slovakia and in households.

1. Introduction

Environmental awareness is generally referred to as an attitude towards the environmental consequences of human behaviour and reactions to environmental issues [1]. Environmental awareness is related to how people perceive and understand the environment. This concept also includes human's ability to behave in an environmentally friendly manner and to encourage others to behave in this way [2]. The concept of environmental awareness is related to the concept of environmental literacy. Environmental literacy is the ability to observe and understand the current situation of the environment and subsequently to do the steps which are necessary to improve or restore this environment [3]. The environmental literate individuals make the environmental decisions by themselves or in cooperation with others and based on those decisions, they contribute to improving the quality of life of other individuals or society as a whole and contribute to improving the quality of the global environment [4]. Environmental education is related to efforts to raise awareness of environmental problems and it provides the knowledge needed for solving the environmental problems [5]. Environmental consumer behaviour is oriented towards the environmental sustainability and the reduction of negative environmental impacts which threaten the environment [6]. In connection with that, the waste management is a set of activities aimed at protecting scarce resources, human health and the environment. These activities include strategic planning, preventing environmental pollution or minimizing waste [7]. Waste is all residual materials that are the result of human activity and can not be reused in the production process, recovered, recycled or used for the energy production [8]. Waste recycling is the process by which the products used are recovered. The used product can be used as an aided material in the production of a new product, which may or may not be similar to the original product [9]. The aim of the thesis was to find out the level of
environmental awareness of consumers in the Slovak Republic and its impact on the consumption of goods, production and subsequent treatment of household waste.

2. Material and methods

2.1 Data collection
An online and printed questionnaire method was used to determine the level of environmental awareness of consumers of household and their waste production. The first part of the questions was focused on basic demographic information about the respondents. The other 14 questions of the questionnaire were aimed at identifying the average amount of household separated waste, the average consumer's food costs, the level of environmental awareness, the exploration of possibilities of waste separation in household or nearby as well as the respondents' opinions on the pro-environmental suggestions.

2.2 Research sample
The research sample consisted of 284 respondents, consumers of households in the Slovak Republic without the age restriction. The average age of respondents was 23.9 years. Most of them were secondary school respondents whose residence was in a city. The number of respondents living in a family house and a flat was almost the same. The average number of members in a respondents' household was 4 members.

2.3 Statistical analysis
There was one research hypothesis tested in this study: We assume that there is no difference between the amount of separated waste estimated by households and the estimated rate of recycled waste in the Slovak Republic in 2018. Available data of the Statistical Office of the European Union EUROSTAT were used. One-sample analysis of normal distribution parameters was performed using Microsoft EXCEL.

3. Results
The results of the research showed that 70% of respondents did not own a composter in a household, but most of them would appreciate this possibility. Quality was the decisive factor in the decision-making of buying food. The respondents' average food costs were 187 €. The purchase of eco-friendly food was preferred by 60% of respondents and 85% preferred buying non-prepacked fruit over packaged. The results showed that most respondents had the opportunity to separate paper, plastic, glass and metals in a household or near their home (Table 1). Despite this fact, it was found that the average monthly amount of waste separated by consumers in a household in the Slovak Republic was only 47.81%, which is a relatively low value (Table 2).

| Question/Answer                        | Yes (Amount) | Yes (%) | No (Amount) | No (%) |
|----------------------------------------|--------------|---------|-------------|--------|
| Do you have the opportunity to separate glass in your household or near your home? | 249          | 87.68%  | 35          | 12.32% |
| Do you have the opportunity to separate plastics in your household or near your home? | 263          | 92.61%  | 21          | 7.39%  |
| Do you have the opportunity to separate paper in your household or near your home? | 245          | 86.27%  | 39          | 13.73% |
| Do you have the opportunity to separate metals in your household or near your home? | 157          | 55.28%  | 127         | 44.72% |
Table 2. Monthly amount of separated waste.

| Estimation of monthly amount of separated waste | Amount | %   | Estimation of monthly amount of separated waste | Amount | %   |
|------------------------------------------------|--------|-----|------------------------------------------------|--------|-----|
| 0% of waste                                     | 8      | 2.82| 43% of waste                                    | 1      | 0.35|
| 3% of waste                                     | 1      | 0.35| 45% of waste                                    | 5      | 1.76|
| 4% of waste                                     | 2      | 0.70| 49% of waste                                    | 1      | 0.35|
| 5% of waste                                     | 6      | 2.11| 50% of waste                                    | 40     | 14.08|
| 8% of waste                                     | 1      | 0.35| 60% of waste                                    | 21     | 7.39|
| 10% of waste                                    | 13     | 4.58| 62% of waste                                    | 1      | 0.35|
| 12% of waste                                    | 2      | 0.70| 65% of waste                                    | 1      | 0.35|
| 15% of waste                                    | 3      | 1.06| 70% of waste                                    | 26     | 9.15|
| 20% of waste                                    | 26     | 9.15| 71% of waste                                    | 1      | 0.35|
| 25% of waste                                    | 3      | 1.06| 75% of waste                                    | 12     | 4.23|
| 30% of waste                                    | 25     | 8.80| 80% of waste                                    | 27     | 9.51|
| 35% of waste                                    | 4      | 1.41| 85% of waste                                    | 4      | 1.41|
| 39% of waste                                    | 1      | 0.35| 90% of waste                                    | 10     | 3.52|
| 40% of waste                                    | 32     | 11.27| 95% of waste                                   | 2       | 0.70|
| 42% of waste                                    | 1      | 0.35| 100% of waste                                   | 4       | 1.41|

Mean                                          47.81%

The development curve of generated and recycled amount of waste in the Slovak Republic between 2010 - 2016 was created on the basis of available data of the Statistical Office of the European Union EUROSTAT. According to the development graphs, it can be stated that generated and recycled waste have been increasing since 2012 (Figure 1).

Figure 1. Development of amount of generated and recycled waste in the Slovak Republic.

The expected value of the recycled amount of waste in the Slovak Republic in 2018 was created by the prediction after the creation of a regression line (Figure 2) based on the available data of the Statistical Office of the European Union EUROSTAT (Table 3).
Table 3. Data of waste amounts needed for prediction.

| Waste/Year                                      | 2010  | 2012  | 2014  | 2016  | 2018  |
|------------------------------------------------|-------|-------|-------|-------|-------|
| Generated waste in the Slovak Republic (kg per capita) | 1 741 | 1 558 | 1 636 | 1 953 | -     |
| Recycled waste in the Slovak Republic (kg per capita) | 660   | 490   | 536   | 584   | -     |
| Recycled waste in the Slovak Republic (% per capita)  | 37.91%| 31.45%| 32.76%| 29.90%| 27.35%|

Figure 2. Trend line of recycled waste in Slovak Republic.

Prediction of expected value of recycled amount of waste in Slovakia in 2018:

\[ y = -1.136x + 2319.8 \]

\[ y = -1.136 \times 2018 + 2319.8 = 27.35\% \]

The predicted value of recycled waste per capita in 2018 is 27.35%.

Research hypothesis: We assume that there is no difference between the amount of separated waste estimated by households and the estimated rate of recycled waste in the Slovak Republic in 2018. Based on the research hypothesis, statistical hypotheses were determined and verified using a suitably selected mathematical-statistical method.

Statistical hypothesis \( H_0 \): The rate of separated amount of waste estimated by households is not statistically significantly different from the expected rate of recycled waste in the Slovak Republic in 2018.

Statistical hypothesis \( H_1 \): The rate of separated amount of waste estimated by households is statistically significantly different from the expected rate of recycled waste in the Slovak Republic in 2018.

Hypothesis testing:

Hypothesis: \( H_0 : m = m_0 \) against \( H_1 : m \neq m_0 \)

Test level: \( \alpha = 0.05 \)

Microsoft Excel, namely TDIST function, was used for the calculation.

Required parameters:

\[ X = \frac{\bar{x} - m_p}{s} = 47.81 - 27.35 = 20.46, \text{ where} \]

\( X \) is the numeric value for which the distribution value is determined,

\( \bar{x} \) is the sample arithmetic mean,

\( m_p \) is median;

\[ DF = n - 1 = 283, \text{ where} \]

\( DF \) is Deg. freedom, a unit representing the number of degrees of freedom that determine the distribution,

\( n \) is the number of elements of the statistical population;
\( T = 2 \), where 
\( T \) is Tails and determines that it is a two-way split.

**Calculation:** After entering the necessary parameters the value of \( p = 9.81456 \times 10^{-58} \) was obtained.

**Conclusion:** \( p < 0.05 \). We reject the hypothesis \( H_0 \).

**Answer:** The rate of separated amount of waste estimated by households is statistically significantly different from the estimated rate of recycled waste in Slovakia in 2018, and therefore our research hypothesis has not been confirmed.

### 4. Conclusion

The study presented the results of the research on the level of environmental awareness and its impact on household consumption of goods. The contribution was focused on production and treatment of consumer waste in the Slovak Republic. Research has shown that consumers are able to separate on average just about 50% of the waste generated on a monthly basis, despite the fact that they have possibilities to separate them. The work also set the estimated rate of recycled waste in Slovakia for 2018 with a value of only 27.35%. The results of the investigation showed that there is a difference between separated amount of waste estimated by households and the estimated rate of recycled waste in Slovakia in 2018, which could indicate the existence and the usage of black waste dumps. On the basis of the obtained results, it could be concluded that it would be appropriate to support an increase of the level of environmental awareness and to motivate consumers to do pro-environmental activities, which would also result in the increase of the level of separation in households and the consequent increase in environmental protection.

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