

# Students' Perception of the Importance of Participating in DRS System

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**Abstract.** The Deposit Refund System (DRS) encourages people to recycle plastic bottles, which helps to reduce the amount of waste that ends up in landfills and also protects the environment. The aim of this article was to find out the level of motivation of students of the University of Economics in Bratislava, from the Faculty of Commerce to participate in the DRS and to define the highest motivation factor that would increase their level of motivation. The aim of the article was also to investigate the current state of the subjective perception of student retention, as well as the possible influence of education.

**Keywords:** Recycling, Education, Deposit Refund System, PET Bottles, Cans, Sustainable Development, Waste Management.

**JEL classification:** Q56, Q58, M31

## 1 Introduction

Nowadays, plastic is a very important and necessary material, but it is necessary to take care of its impact on the environment and the efficiency of its use (Watkins, E., et al., 2019). The DRS is one of the economic instruments used for environmental protection that helps with several environmental and social problems (Numata, D., 2009). First, it can reduce waste by encouraging people to return their empty PET bottles and cans instead of throwing them away. Secondly, thanks to this system, it is possible to increase the rate of recycling and reduce the use of original materials. Many studies that have been conducted have confirmed the positive impact of DRS on reducing inappropriate waste disposal (Calabrese, A., et al., 2021). When people return their empty packaging, it can be properly recycled and reused, reducing the need to extract and process new materials. Finally, a DRS can also generate economic benefits, such as creating jobs in the recycling industry and generating revenue from the sale of recycled materials. It can also reduce waste management costs, which can benefit communities and local governments. The DRS enabled the reduction of environmental

pollution and promoted the recycling of a large amount of materials (Numata, D., 2009). It is therefore an effective approach to reducing waste and increasing the rate of recycling (enviweb.cz, 2003). The aim of this article was to find out the level of motivation of students of the University of Economics in Bratislava to participate in the Deposit Refund System, identify the highest motivation factor and to find out if passing education process about this topic had an impact on students' subjective perception of knowing the target that is set for 2023. We believe the findings will help us to focus our future efforts on increasing participation in the DRS and motivate our students to participate in the DRS to the greatest extent possible. We found out that most of the students from our sample either strongly agree or agree that they are motivated to participate in the DRS. The highest motivation was found to be the deposit amount. We found that only a minority of students think they know the goal set for 2023 for returning PET bottles and cans. Also, only a minority of the students passed the educational process on this topic.

## **2 Background and literature review**

The history of the Slovak deposit return system began in 2003, when the possibility of its implementation was first mentioned. In 2019, a strategy was defined and it focused on recycling of PET bottles and metal and aluminium cans. On January 1, 2021, the Ministry of the Environment established the administrator of the deposit refund system as the governing body of the DRS in Slovakia. DRS Administrator created a consortium of four non-profit professional associations that represent manufacturers and retailers, covering 80% of products in plastic bottles and cans on the Slovak market and approximately 3,000 business establishments. Slovakia launched this system on January 1, 2022 as the 11th European country and it took 10 months (sensoneo.com, 2023). In 2022, Slovakia has introduced a deposit return system for PET bottles and cans. The system requires beverage manufacturers to collect a deposit for their products, which is returned to the consumer by the retailer when empty containers are returned to designated collection points. The goal of the system is to increase the recycling rate and reduce the amount of waste (slovenskozalohuje.sk, 2023). It also ensures a sufficient amount of secondary raw materials for the production of fully recycled packaging (Schneider, D., Tomić, T., Raal, R., 2021). The Deposit refund system requires consumers to pay a deposit which is subsequently refunded when consumers return the reusable part of the commodity (Kulshreshtha, P., Sarangi, S., 2001). For each returned PET bottle and can that is marked with the Z sign and whose volume is from 0.1 to 3 liters, €0.15 is returned to the consumer (odpady-portal.sk, 2022).

By providing a financial incentive for consumers to return their empty packaging for recycling, the system promotes responsible disposal and reduces the amount of waste that ends up in landfills or harms the environment. In 2023, Slovakia must focus on ensuring sustainable, efficient and ecological transport by strengthening and optimising the vehicle fleet or strengthening the infrastructure of intermediate warehouses (asb.sk, 2023). This system is already operating in many European countries.



of collection points as well as ensuring that retailers have the capacity to handle and store large volumes of returned bottles and cans (minzp.sk, 2018).

Another challenge is the involvement of all stakeholders, including retailers, manufacturers and policy makers. Some may resist the change due to concerns about increased costs or administrative burden. In addition, there may be issues related to public awareness and education regarding the issue. Some people may not be familiar with the DRS or may be resistant to changing their habits, which may limit the effectiveness of the program (wri.com, 2023). Finally, there may be technical and legal challenges to overcome, such as the need to comply with various environmental regulations and requirements (linkedin.com, 2018). Despite the challenges, implementing a DRS is worth it. The benefits of reducing waste and promoting recycling can have long-term positive effects on the environment and public health. In addition, the introduction of such a system can create economic opportunities, such as the development of new jobs in the recycling and waste management sectors (Royne, Marla B., et. al., 2015).

It is important to note that while there may be challenges in implementing a deposit refund system, these challenges can be addressed through careful planning, stakeholder engagement, and effective public communication. With the right approach, it is possible to establish an efficient and sustainable system that will benefit everyone.

Four principles that must be followed to achieve the same collection efficiency:

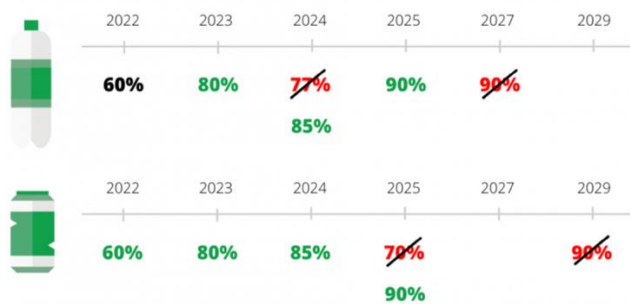
1. Performance - in order to fulfill the goal and achieve the desired results, it is necessary to match a meaningful amount of deposits with a sufficient amount of collected packaging.
2. Convenience - it is important that the system is practical, fair and easily accessible for consumers and also traders who will choose the packaging.
3. Producer responsibility – The deposit system is funded by producers, their investment will be returned thanks to unclaimed deposits through commodity returns and eco-modulated extended producer responsibility fees.
4. Integrity of the system - Data clearing centers, reliable management of redemption technology and transparent will build confidence in the system (collection-sk.tomra.com, 2023).

An effective DRS is able to capture up to 90% of all disposable packaging (collection-sk.tomra.com, 2023). The biggest advantage of the mandatory deposit-return system for beverage packaging is its proven performance, as the return rate can reach more than 90%. The amount of the deposit gives consumers a reason to return the bottle, thanks to which less waste ends up in landfills (minzp.sk, 2018)

## **2.1 The deposit return system in Slovakia**

In Slovakia, the deposit refund system for PET bottles and cans is a very positive step that could ensure a more sustainable future. It is important to implement policies and promote responsible consumption and management that uses waste efficiently, thereby minimizing it (euractiv.sk, 2022). The success of a DRS depends on several factors, including public awareness and participation, collection and recycling efficiency, and enforcement. In order to ensure efficiency in achieving goals, it is important to monitor

the impact of the system on Slovak consumers, or their willingness to participate in recycling (odpady-portal.sk, 2018). It is important to inform people about the benefits of a DRS for several reasons. First, awareness can increase participation in the system. When people understand the benefits of DRS, they are more likely to get involved and help achieve the goals. The goal set for 2023 is to return 80% of all PET bottles and cans. The return target of 85% is set for 2024, and we should reach 90% in 2025 (minzp.sk, 2023).



**Fig. 2.** Return targets for PET bottles and cans for the Slovak Republic (Bede, D., 2021).

Motivating people to participate in DRS can be challenging. However, there are some aspects as education, convenience, incentives, awareness campaigns and community involvement that can help (slov-lex.sk, 2023).

By combining these strategies, it is possible to motivate more people to participate in the deposit return system and have a positive impact on the environment. This system deals with the reduction of the most visible part of waste in cities and nature and to achieve the goals in the field of recycling (Balcers, O., Brizga, J., Moora, 2019). The financial reward proved to be the only system capable of ensuring 90% recycling. The system works on a principle that is based on charging a surcharge that reflects the cost of inefficient packaging disposal. Subsequently, when it is returned, there is a discount in the amount of the fee paid, which ensures that the packaging is returned in good condition and can be used again. The financial motivation can ensure the circulation of the life cycle of materials such as plastic and aluminum (ecobnb.com, 2020).

### 3 Research objectives and methodology

The aim of this paper was to find out if students of generation Z from the Faculty of Business at the University of Economic are motivated to participate in the DRS system in Slovakia and to find which is the highest motivation factor that increases their motivation. The aim of this article was also to find out if passing the education process about this topic has an impact on students' subjective perception of knowledge about the target that is set for returning PET bottles and cans for Slovakia in 2023. The main goal could be fulfilled with the help of a sub-goal, which represented obtaining information about the DRS in Slovakia.

To achieve the set we used universal methods as deduction, abstraction, collection, analysis, synthesis and primary quantitative research. In the primary quantitative research, we addressed students of the Faculty of Business from the University of Economics in Bratislava. Students from were asked to fill out a questionnaire in which they answered their attitude towards the backup system in Slovakia. The survey took place for 2 weeks from 12/04/2023 to 26/04/2023 and 149 respondents took part in it. The population was defined as the students of the Faculty of Business. Based on this definition, we created a sample.

#### **Representative sample size**

$$n = \frac{(z^2 \times p \times (1 - p)) + e^2}{e^2 + z^2 \times p \times \frac{(1 - p)}{N}}$$

Population size (N): 1100

Permissible margin of error in % (e): 7,47

Variance in % (p): 50

Confidence level in %: 95

n = 149

#### **Research questions formulated by the authors:**

**RQ1:** How motivated are students to participate in the DRS by recycling PET bottles and cans?

**RQ2:** What is the highest motivating factor?

**R3:** Do you think you know the target that is set for the year 2023 for the Slovak republic?

**R4:** Did you pass the education process at the University of Economics that was related to the Deposit Refund system?

## **4 Results and discussion**

In this article we focused on the attitude of students of the University of Economics in Bratislava from the Faculty of Commerce towards participation in the DRS. Our aim was to identify their level of motivation, the highest motivation factor and also whether passing education process about this topic has an impact on their subjective perception of their knowledge of the set target for returning PET bottles and cans in Slovakia in 2023.

**RQ1:** How motivated are students to participate in the DRS by recycling PET bottles and cans?

**Table 1.** The level of motivation of students to participate in the DRS by recycling PET bottles and cans.

**How strongly do you agree that you are motivated to participate in the DRS? (1 – strongly disagree, 5 – strongly agree)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	1,3	1,3	1,3
	2	13	8,7	8,7	10,1
	3	12	8,1	8,1	18,1
	4	55	36,9	36,9	55,0
	5	67	45,0	45,0	100,0
	Total	149	100,0	100,0	

Source: Author's own research processed in SPSS

From the table above we can see that 67 students strongly agree that they are motivated to participate in the DRS by recycling PET bottles and cans. Second largest group of students, which is 57 of them answered they rather agree that they are motivated to participate in this system. We found out that 122 (81%) of all students either strongly agree or rather agree they are motivated, 12 (8,05%) students answered that their motivation is neutral, 13 (8,72%) answered that they are rather not motivated and 2 (1,34%) students answered that they strongly disagree that they are motivated.

**RQ2:** What is the highest motivation factor?

**Table 2.** The highest motivation factor  
**What would increase your motivation level?**

		Frequency	Percent	Cumulative Percent
Valid	More collection points	59	39,6	39,6
	More advertising campaigns explaining the importance of participating in the DRS	14	9,4	49,0
	Greater awareness of the importance of the DRS in educational institutions	14	9,4	58,4
	Increasing the deposit amount	62	41,6	100,0
	Total	149	100,0	

Source: Author's own research processed in SPSS

From the table above, we can see that 62 students (42%) marked increasing the deposit amount as a highest factor that increases their level of motivation. The second largest group of students representing 59 (40%) of them identified increasing the number of places to collect PET bottles and cans as the second highest motivation factor. 14 (9%) answered that their motivation would be increased by advertising campaigns and the

last part of the students, which is 14 of them (9%) answered that greater awareness of the importance of the DRS in educational institutions would motivate them to participate in the system.

**R3:** Do you think you know the target that is set for the year 2023 for the Slovak republic?

The question was dichometrically determined, while the emphasis was on subjective perception.

**R4:** Did you pass the education process at the University of Economics that was related to the Deposit Refund system?

**Table 3.** The impact of the education process related to the DRS on the knowledge of the amount of the return target of PET bottles and cans

		Do you think you know the target that is set for the Slovak Republic in 2023?		Total
		Yes	No	
Did you pass the education process at the University of Economics that was related to the Deposit Refund system?	Yes	23	34	57
	No	28	64	92
Total		51	98	149

Source: Author's own research processed in SPSS

From the above table, we can see that 51 students (34%) of all students responded that they think they know the return target for PET bottles and cans, which was set for the Slovak Republic in 2023.

We found that only 57 of students (38%) went through educational process regarding the Deposit return system and its importance of which 23 students (40%) think they know the goal that is set for 2023 and 34 (60%) of them think they don't know the goal. 92 of students (62%) did not pass educational process at all and from this group, 28 students (30%) think they know the goal that is set for 2023 and 64 of the students (70%) don't think they know what is the set goal.

From all of the students in total, we found out that from 149 students (100%) only 23 students, which represents 15% of all respondents think they know the target of returning PET bottles and cans in DRS thanks to the passing the educational process at the University of Economics.



Our effort was to generalize the results to a defined population, for which we used the Chi-square test due to the nature of the data. We recorded the results of the Chi-square test in Table no. 4.

**Table 4.** Chi-square test

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1,787 <sup>a</sup>	1	0,181
Continuity Correction <sup>b</sup>	1,342	1	0,247
Likelihood Ratio	1,772	1	0,183

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 19,26.

b. Computed only for a 2x2 table

Pearson's Chi-Square value is 1.787 with 1 degree of freedom. The asymptotic significance is 0.181 (p-value), which indicates that there is no significant association between the variables in the table. The continuity correction value is 1.342 and the likelihood ratio is 1.772, both with 1 degree of freedom. The asymptotic significance for both of these values is above 0.05, indicating that there is no significant association between the variables.

It should be noted that independence can be assumed on the basis of the test, which means that the education process related to the given topic was not related to the knowledge of the goal related to backup, which is set for the year 2023. Due to the non-fulfillment of all assumptions, the Chi-square test can be considered the result is only indicative.

We found that the educational process is poorly set up. It is necessary to focus more time on the topics of sustainability, to explain to young people the importance of participation in achieving the goals set by the European Union. Based on these findings, we recommend intensifying education at the Faculty of Business on this topic, as it is very important for the future of sustainability in our country. It is necessary for young people to participate in the fulfillment of the set goals, because they are the last generation that can prevent global warming (theguardian.com, 2018). We also recommend creating more collection points, as young people stated in the discussion that they do not want to carry empty containers with them. We recommend the creation of collection points at universities, as this factor was marked as one of the highest that would increase motivation of students. It would also be appropriate to educate young people about this issue by using marketing campaigns that would explain the importance of participating in the DRS, as those campaigns. The state, universities and

interest groups should increase the intensity of their communication and intensively communicate the benefits of this system in detail

## 5 Conclusion

The deposit return system represents an effective and sustainable solution for various environmental challenges. It supports responsible consumption and conservation of resources and reduces waste generation. By refunding the monetary value for returning PET bottles or cans, consumers are motivated to participate in the DRS, which leads to an increase in the recycling rate and also to a reduction in the amount of waste. We found that the amount of the deposit is the highest motivation factor for the students of the Faculty of Business of the University of Economics in Bratislava. The second highest motivation factor is increasing the number of collection points, where they can return used PET bottles and cans. Regarding students' motivation to participate in the Deposit refund system, 81% of the students have a positive attitude and answered that they strongly or rather agree that they are motivated to participate in this system. We also investigated whether the educational process about the importance of the DRS changed their subjective perception regarding the knowledge of the return target set for Slovakia for 2023. We found that out of 149, 92 students did not pass the education process at all, 57 students passed the education process and most of them, representing 34 (60%) students, still do not think they know what goal is set for 2023 for Slovak republic.

This research was conducted only at the Business Faculty, it would be appropriate to conduct research at the entire University of Economics in Bratislava and also at other universities, because it is these educational institutions that create the behavior of young people. In the future, it would also be appropriate to address the attitude of young people towards the researched problem, so that the consequences of these behavioral intentions can be better understood. Other studies conducted on young Slovaks (e.g. Čvirik-Ölveczká, 2020, Čvirik et al., 2021) reached similar conclusions about the need to increase education.

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