

# Progress in the Transition of the Circular Economy in Slovakia and the European Union

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## Abstract

The transition from a linear economy to a circular economy is one of the main priorities for the development of the European Union and is also part of its industrial strategy. The transition to a circular economy is a key element of the European Union's efforts to develop a sustainable and competitive economy through resource efficiency. In its Circular Economy Action Plan, the European Commission has formulated measures to stimulate the transition to a circular economy in the European Union, while expressing the need to introduce and improve tools and indicators to monitor progress in this area. The aim of the paper is to assess whether the circular economy in Slovakia and the European Union has progressed or regressed in the last decade. The theoretical part is based on the analysis of the literature, while the empirical part uses basic scientific methods to analyze current economic policy in the field of circular economy in Slovakia and the EU and analyze the development and current state of implementation of circular economy in Slovakia and the EU based on macro indicators proposed by the European Commission.

**Keywords:** circular economy, economic policy, macro indicators, sustainable development

**JEL:** Q55, Q56, Q58

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## Introduction

We consider the economic system as we currently know to be primarily linear, which means that natural raw materials are constantly being mined for production, the resources of which are not enough to renew, resp. are non-renewable. Consumption of non-renewable raw materials is constantly increasing in the current growth of production, which in nature leads to their reduction, which logically cannot work in the long run. In addition to their use on the domestic market, these raw materials are exported and sold to other countries, which use them for further processing. Finished products for which non-renewable raw materials have been used are also exported. The consumer usually throws them away after use, so the life of these products will be ended up in landfills, incinerators and, in the worst case, just somewhere thrown in nature. Many other negative factors are added to all this, such as the population explosion, the growing consumer society and the devastating human impact on the environment. We can quite rightly consider this system to be unreasonable and unsustainable in the long run in at least three respects, from an economic, environmental but also a social point of view. In today's society, there is a huge effort to turn the linear system of the economy into a circular one. The circular system of the economy is more often referred to as the circular economy. Since 2015, this issue has become a key political issue throughout the European Union. In the same year, the European Commission adopted the "EU Circular Economy Action Plan". The document includes specific measures concerning the entire product life cycle, from design, resources used for production, through production, sale, consumption, repair, refurbishment through the question of what to do with waste to the return of raw materials back to the economy and their new use in the form secondary raw materials. The document states that these measures need to be met in order to move towards a sustainable economic model.

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## Theoretical Background

The growth of industrial production, electricity and heat production, mining, agricultural activities associated with population growth and caused by increased demands on housing, transport, consumption, and related infrastructure, causes an increase in demands on natural resources, as well as an increasing impact on the quality of life environment. This influence no longer has the character of a local effect on the area around the place of its origin, but it is increasingly manifested in a global perspective. Since the beginning of the industrial revolution in the 19th century, environmental pollution has intensified and become a global problem. Mankind can see the consequences in the deterioration of the quality of water, air, soil but also various ecosystems. At the same time, environmental pollution is directly linked to human health and welfare (Guštafíková et al., 2019). This influence no longer has the character of a local effect on the area around the place of its origin, but it is increasingly manifested in a global perspective. The solution to this problem is the circular economy, the concept of which was first introduced by the British environmental economists David W. Pearce and Kerry R. Turner in 1989 (Pearce & Turner, 1990). The circular economy is the successor to the current model of a linear economy, dependent on the high consumption of non-renewable resources. The linear economy is economically, ecologically, and socially unsustainable in the long run (Goyal et al., 2018), does not meet the needs of today's society, and cannot sufficiently reflect the solution of the problems outlined above. The circular economy promotes more appropriate and environmentally sound use of resources (Kirchherr et al., 2017). Generally speaking, recirculation of resources in the circular economy comes from a cycle of taking, transforming, using, and returning. Industries take resources from the environment and transform them into services and products. These are then distributed and used by consumers or other businesses as part of other products. Despite the importance of the concept of circular economy, research in this area is insufficient and the effects of the circular economy on business and society need to be examined in more detail (Korhonen et al., 2018). As there is a presumption that future economic growth cannot be secured in an extensive way, it is essential to use resources in a much more sustainable and efficient way. Only in this case will we be able to talk about sustainable growth. In 2015, United Nations members adopted a document entitled Agenda 2030 for Sustainable Development. This document was a response to the efforts of the world community and economic policy makers to address these issues. The Agenda 2030 includes 17 targets, with an emphasis on sustainable consumption and production processes that alleviate the problems of scarcity of natural resources. In addition to the UN, in 2015 it adopted the European Union Action Plan for the Circular Economy in this area. Emphasis is placed on measures throughout the product life cycle (Guštafíková et al., 2019).

## Economic Policy in the Field of Circular Economy

As the behavior of individuals is often deep-rooted, and thus resistant to change, a potentially less complicated policy lever is to encourage manufacturers to embrace the principles of circular design through the introduction of circular design standards and norms. Circular economics policies therefore focus primarily on waste management, including process-based approaches to waste elimination (Hartley, 2019). EU environmental policy is based on environmental action programs, which usually set out guidelines for policy development over the next ten years. (Farmer, 2020). The EU's commitment to technological change as a means of achieving sustainable development dates back to the early 1990s (Colombo, 2019). In December 2019, the European Commission presented a new growth strategy called the European Green Agreement, which aims to transform the EU economy for a sustainable future. Its main goal is to transform the EU economy. The circular economy is one of the main areas of this strategy, and the European Commission is setting out a new Action Plan for the circular economy. It will focus on the sustainable use of resources and a new industrial strategy. Platforms at EU level called the European Circulating Economy Platform have been set up under this issue. Current EU circular economy policy is based on the Circular Economy Action Plan. It aims to support Europe's transition to a circular economy that will foster global competitiveness, promote sustainable economic growth and create new jobs. This action plan sets out a series of measures to start achieving it. These measures cover several issues, but special emphasis is placed on resource efficiency, improving waste management and promoting innovation - all of which are strongly emphasized in earlier policy developments. The measures developed as a result of the action plan included a framework for monitoring the circular economy and reviewing existing waste legislation (European Commission, 2018). The new action plan announces initiatives throughout the product life cycle. It focuses on how products are designed, promotes circular economy processes, promotes sustainable consumption and aims to ensure that waste is prevented and that the resources used are maintained in the EU economy for as long as possible. It introduces legislative and non-legislative measures in areas where action at EU level brings real added value. The measures to be introduced under

the new action plan are aimed at:

- make sustainable products the norm in the EU
- strengthen the position of consumers and public purchasers
- focus on the most resource-intensive sectors where the potential for circulation is high, such as: electronics and information technology, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water and nutrients
- produce less waste
- to support the circular economy not only at the level of enterprises, but also for people, regions and cities
- lead the global circular economy effort

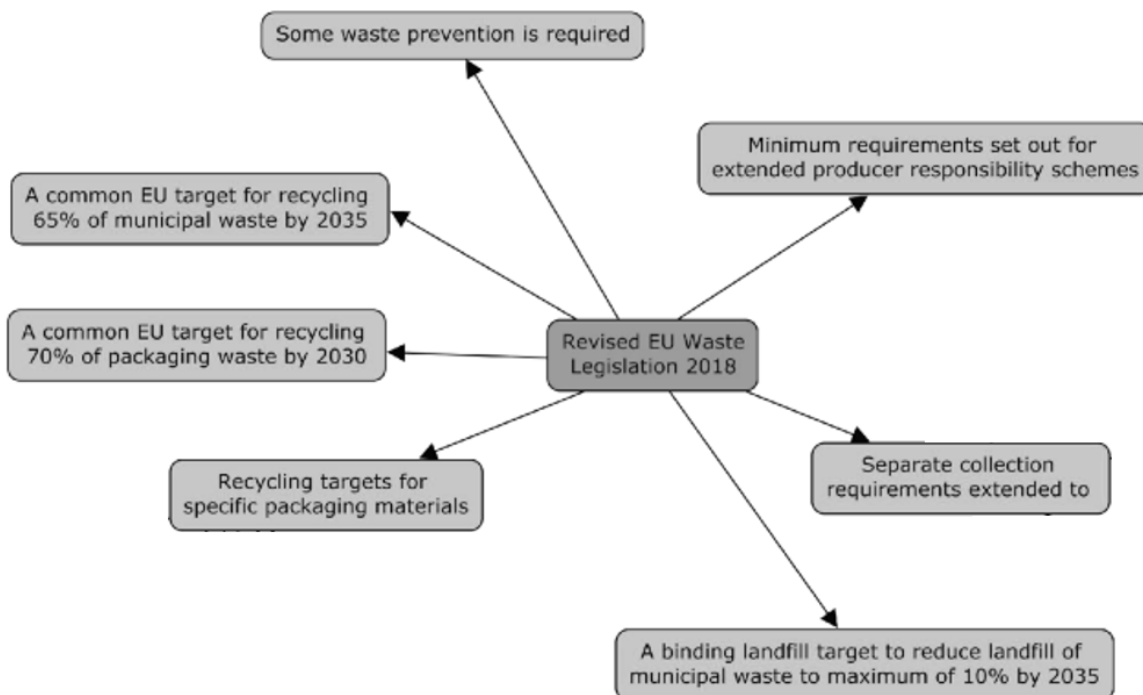


Figure 1. Objectives in the Field of Circular Economy in Connection with the Revision of Legislation  
Source: European Commission (2018)

Although the development of circular economy policy is advancing, it is important to consider how well the EU is doing in terms of major material flows with waste generation and recycling. As a key contribution to the circular economy, the EU has made some progress in reducing waste (in an effort to decouple waste from economic growth) and in improving recycling rates, but there are areas where problems persist (Farmer, 2020). Therefore, one of the measures in the circular economy action plan was the revision of EU waste legislation to promote better waste management, as this is clearly a problem that needs to be addressed. The revised waste legislation entered into force in 2018. It contains a number of measures to support the implementation of circular economy, including setting mandatory targets for Member States on many waste management issues. Figure 1 shows how the waste management targets were adjusted during the 2018 revision of the legislation.

In the area of economic policy in Slovakia, in accordance with the European Green Agreement, a platform called the Green Economy was created, in which solutions in the area of the circular economy are published. One of the initiators and founding partners is the Ministry of the Environment of the Slovak Republic. The aim of the platform is to inform and promote cooperation between all sectors in the transition to a circular economy. In cooperation with the Slovak Environment Agency, they prepared a publication entitled Circular Economy - The Future of Slovakia's Development, in which they focused on several topics related to the circular economy such as production and consumption, waste management, secondary raw materials, competitiveness and innovation.

## Monitoring Progress in the Circular Economy

In order to identify the factors for the success of the transition to a circular economy in individual EU countries, it is necessary to monitor the main trends. The results of the monitoring should then form the basis for setting new priorities in the area of the transition to a circular economy. The European Commission has committed itself in the Circular Economy Action Plan to proposing a simple and effective monitoring framework. This was also confirmed by the EU Council in its conclusions on the circular economy action plan, which emphasized the need to establish a monitoring framework to strengthen and assess progress towards the circular economy, while minimizing administrative burdens. The European Parliament has also called on the European Commission to develop resource efficiency indicators to monitor progress in the circular economy (European Commission, 2018). Monitoring progress in the circular economy is considered difficult.

The transition to a circular economy is not limited to certain materials or sectors. It is a systemic change that affects the whole economy and includes all products and services. Ideally, monitoring indicators should, in particular, capture trends in the preservation of the economic value of products, materials and resources, as well as in the volumes of waste generated. However, there is no universally accepted indicator and the availability of reliable ready-made indicators describing the most relevant trends is limited. The complexity of the transition to a circular economy, including all its dimensions, cannot be adequately captured by a single measure or point evaluation. Therefore, a set of relevant indicators is provided in the evaluation framework. The monitoring framework aims to measure progress towards the circular economy so as to cover individual aspects at all stages of the life cycle of resources, products and services. The monitoring framework consists of ten indicators (see Table 1) grouped into four phases and aspects of the circular economy:

- production and consumption,
- waste management,
- secondary raw materials,
- competitiveness and innovation.

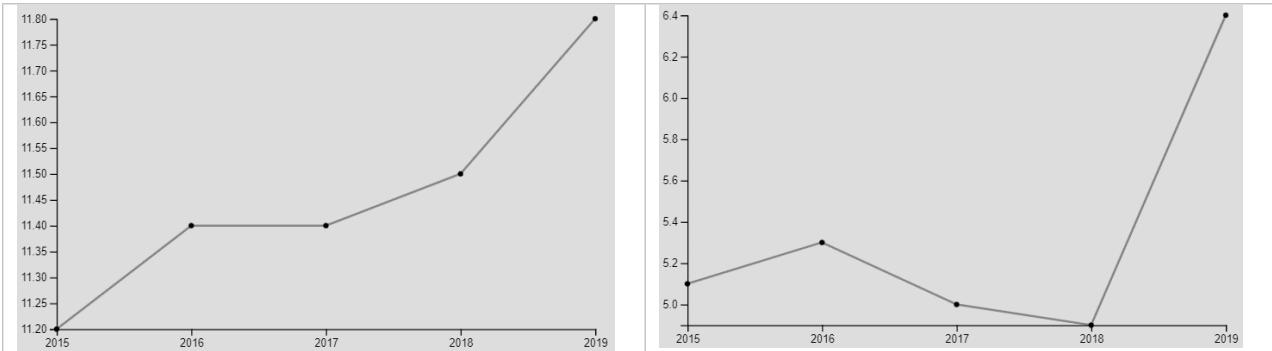
*Table 1. Indicators of the Monitoring Framework of the Transition to the Circular Economy  
Source: European Commission (2018)*

	Indicator	Description
1	EU self-sufficiency in raw materials	The circular economy should help address the risks associated with the supply of raw materials, especially critical ones.
2	Green public procurement	Public procurement accounts for a large share of consumption and can be a driving force for the circular economy.
3	Waste generation	In the circular economy, waste generation is minimized.
4	Food waste	Food disposal has an adverse effect on the environment, the climate and the economy.
5	Total recycling rate	Increasing recycling is part of the transition to a circular economy.
6	Recycling rate for specific types of waste	It reflects progress in recycling key types of waste.
7	The contribution of recycled materials to satisfying the demand for raw materials	In the circular economy, secondary raw materials are commonly used to produce new products.
8	Trade in recyclable raw materials	Trade in recyclable materials reflects the importance of the internal market and global participation in the circular economy.
9	Private investment, employment and gross value added	It takes into account the contribution of the circular economy to job creation and growth.
10	Patents	Innovative technologies linked to the circular economy strengthen the EU's global competitiveness.

In the next part, we present and evaluate the development of selected five indicators of the monitoring framework of the circular economy in the European Union and Slovakia, while we provide a definition according to Eurostat for the indicators.

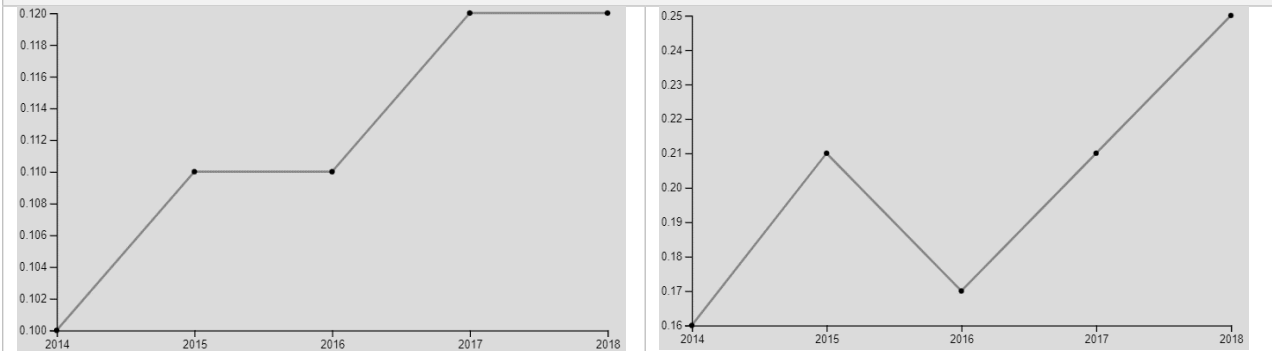
Table 2. Comparison of the Development of Selected Indicators of the Circular Economy in Slovakia and in the European Union

European Union	Slovak Republic																								
<p><b>Generation of municipal waste per capita (Kg per capita)</b></p> <p>The indicator measures the waste collected by or on behalf of municipal authorities and disposed of through the waste management system. It consists to a large extent of waste generated by households, though similar wastes from sources such as commerce, offices and public institutions may be included.</p>																									
<table border="1"> <caption>Generation of municipal waste per capita (Kg per capita) - European Union</caption> <thead> <tr> <th>Year</th> <th>Value (Kg per capita)</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>480</td> </tr> <tr> <td>2016</td> <td>490</td> </tr> <tr> <td>2017</td> <td>496</td> </tr> <tr> <td>2018</td> <td>496</td> </tr> <tr> <td>2019</td> <td>501</td> </tr> </tbody> </table>	Year	Value (Kg per capita)	2015	480	2016	490	2017	496	2018	496	2019	501	<table border="1"> <caption>Generation of municipal waste per capita (Kg per capita) - Slovak Republic</caption> <thead> <tr> <th>Year</th> <th>Value (Kg per capita)</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>330</td> </tr> <tr> <td>2016</td> <td>348</td> </tr> <tr> <td>2017</td> <td>378</td> </tr> <tr> <td>2018</td> <td>415</td> </tr> <tr> <td>2019</td> <td>420</td> </tr> </tbody> </table>	Year	Value (Kg per capita)	2015	330	2016	348	2017	378	2018	415	2019	420
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<p><b>Recycling rate of municipal waste (percentage)</b></p> <p>The indicator measures the share of recycled municipal waste in the total municipal waste generation. Recycling includes material recycling, composting and anaerobic digestion. The ratio is expressed in percent (%) as both terms are measured in the same unit, namely tonnes.</p>																									
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<p><b>Circular material use rate (percentage)</b></p> <p>The indicator measures the share of material recovered and fed back into the economy - thus saving extraction of primary raw materials - in overall material use. The circular material use (CMU) rate is defined as the ratio of the circular use of materials to the overall material use. A higher CMU rate value means that more secondary materials substitute for primary raw materials thus reducing the environmental impacts of extracting primary material.</p>																									



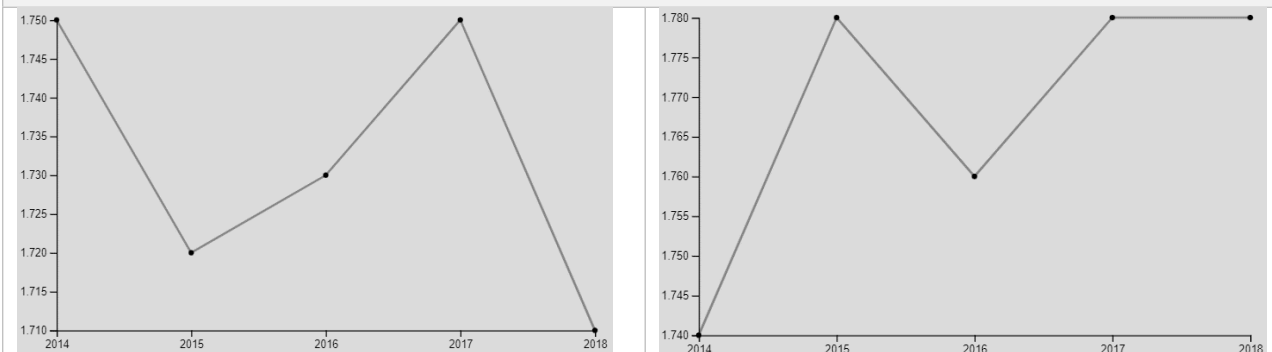
**Gross investment in tangible goods (percentage of gross domestic product (GDP) at current prices)**

Gross investment in tangible goods is defined as investment during the reference year in all tangible goods. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalised production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. Investments in intangible and financial assets are excluded.



**Persons employed (percentage of total employment)**

Jobs are expressed in number of persons employed and as a percentage of total employment. Number of persons employed is defined as the total number of persons who work in the observation unit, i.e. the firm (inclusive of working proprietors, partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it - e.g. sales representatives, delivery personnel, repair and maintenance teams. It excludes manpower supplied to the unit by other enterprises, persons carrying out repair and maintenance work in the enquiry unit on behalf of other enterprises, as well as those on compulsory military service.



Source: own processing based on European Commission (2018)

Despite the declining trend until 2015, the average amount of municipal waste per capita in the EU between 2011 and 2020 increased by 0.6% to 502 kg per person per year. This is one of the few areas where the results of the indicator depend directly on the behavior of the citizen and not the company. Large differences can be observed between Member States in this area, and in some Member States the generation of municipal waste is still increasing. Luxembourg and Denmark have the highest values, while Romania and Poland have the lowest. In the case of Slovakia, there was an increase of 35.4% to an average value of 421 kg per capita in 2020. Based on data from the Ministry of the Environment of the Slovak Republic, it can be stated that despite the decrease in the amount of waste deposited in landfills, a high share of landfills still persists. The recycling rate is increasing, but the growth rate is insufficient to meet the target. The slowdown in the growth rate of municipal waste and the decline in the landfill rate of municipal waste indicate a problem in meeting the target of increasing the recycling rate of municipal waste, including its preparation for re-use, to 60% by 2030 and reducing its landfilling rate to less than 25% by 2035. We can also observe large differences in EU countries in the area of municipal waste recycling. In this case, we can observe a positive trend, when the value of recycled materials increased from 38.9% in 2011 to 47.7% in 2020. The target value for 2030 has already been reached by Germany. Austria and Slovenia also have a high recycling rate. On the contrary, the lowest values of the indicator are achieved by Romania, Greece or Portugal. In the circular economy, materials that are part of products and components are recycled at the end of their useful life and then returned to the economy as secondary raw materials. This mitigates the environmental footprint of production and consumption and increases the security of supply of raw materials. In the EU, the demand for raw materials exceeds the amount that could be supplied, even if all waste turned into secondary raw materials. Supplies of primary raw materials will therefore continue to be necessary. Despite a steady improvement in trend since 2004, recycled materials meet only about 10% of EU material demand on average (European Commission, 2018). In the case of many materials, secondary raw materials satisfy more than 30% of total demand (this applies, for example, to copper and nickel). However, for many of these materials, including almost all critical raw materials, the share of recycled materials in meeting the demand for raw materials is low. This may be because recycling is not profitable, recycling technologies are lacking or materials are part of products that have been used for a long time (European Commission, 2018). The average value of the indicator in the EU reached 11.8% in 2019. Romania and Bulgaria have the lowest values, while France, the Netherlands and Belgium have the highest values. In 2019, Slovakia reached a value of 6.4%. The last two indicators we present are related to competitiveness and innovation. We assume that the transition to a circular economy increases investment, added value and employment and stimulates innovation. In the case of the indicator, value added from sectors related to the existence of the circular economy amounts to approximately 1% of GDP in the EU countries, in Slovakia it was approximately 0.84% in 2019. In connection with the existence of the circular economy, approximately 43,000 jobs have been created in Slovakia, which is an increase of approximately one percent over the last 7 years. In total, 1.78% of employees work in this area in Slovakia, which is more than the average of the European Union countries (1.71% in 2018).

## Conclusion

The European Union has taken important steps forward in the last decade to support the circular economy. It is clear that there is no magic in achieving this goal, but that action is needed in a wide range of policy areas. However, progress in some areas is better than in others. For example, much larger measures are needed in policy areas such as ecodesign and environmental tax reform, as well as the strengthening of supportive policies and the financing of economic policy instruments. (Farmer, 2020). The indicators of the monitoring framework for the transition to a circular economy show that the countries of the European Union are moving forward in this area. The problem may be that the shift is too slow in some areas. At the same time, there are very large differences in indicators between countries. The Slovak economy is characterized by a positive development of the economy, but at the same time by a growing consumption of material resources and a limited base of natural resources. As a result, it is highly dependent on external markets for both the import of raw materials and the export of products. Within the countries of the European Union, Slovakia has one of the highest landfill rates for municipal waste, which leads to a waste of valuable natural resources and a negative impact on the environment. Increasing resource efficiency and the transition to a circular economic model is therefore of paramount importance for the country's sustainable growth and increased prosperity. (Gušťaříková et al., 2019).

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