DIPLOMA THESIS

GALOVICS BERNADETT ERZSÉBET

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CIRCULAR ECONOMY: INTEGRATING CIRCULAR ECONOMY PRINCIPLES ONTO TOURISM

Made by: **Galovics Bernadett Erzsébet**
FZY4S9
Rural Development Engineering BSc
Part-time education
Károly Róbert Campus

Supervised by: Prof. Dr. habil. Dávid Lóránt Dénes, research professor, Károly Róbert Campus

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1. Introduction

„A circular economy is a step in the right direction towards a permaculture economy."

- Hendrith Vanlon Smith Jr.

There are personal reasons for me why I have choose this specific topic as my thesis. Since 2015 I am volunteering for a youth association in Hungary. Until now I have travelled around Europe and have been participating/coordinating Erasmus+ projects and have met with different youngsters who has different cultures, backgrounds and way of thinking. There are several projects in the EU where we can expect that these type of training courses and volunteering programs results should be generated in such way that they can be transferred to other sectors, sustained after the projects and have an impact on future policies and practices. In addition it is important to highlight the added value to Europe on the activities supported by the EU. This can help to create a positive image in the public and provide an incentive for wider participation in the EU programs. This can achieve the expected goal of contributing to the implementation and formulation of national and European policies and systems through projects.

In connection with the present research, my focus is on continous, visible, but financially effective, sustainable organic spreading communication. In addition to the opportunities offered by online space, there is a strive to get to know and exploit innovative offline opportunities that can reach the individuals worldwide, which are suitable for multiplying such projects, increasing the impact, disseminating the results as widely as possible, even when combined with online, digital tools to address.

The overarching, immediate goal of my project is for the individuals in different countries to learn about Circular Economy and Circular Tourism that will effectively and successfully disseminate the future results widely, and contribute to increase the visibility of the new perspectives that I have find extremely important during my researches.

The concept of circular economy has gained significant attention from scholars in recent years as a way to manage resources sustainably. By reducing waste, extending product life, promoting material recycling, updating productivity and renewable energy systems, the circular economy aims to maximize resource efficiency. This concept has great potential to contribute to the economic, social, and environmental aspects of the tourism industry. Implementing circular economy practices across the entire tourism industry value chain can

drive sustainable practices and lead to a more sustainable, robust, safe, and inclusive way of travel. Scholars have discussed circular economy in the literatures of tourism from a variety of perspectives, including climate change, economic and business perspectives, social perspectives, policy and governance perspective, and digital and technological perspective. By mapping the research landscape, scholars can identify research gaps, highlight areas of consensus, and find potential paths for future research. This will be a valuable resource for scholars, policymakers, and practitioners who want to deepen their understanding of the crucial habits of the circular economy in the context of tourism.

What is the major research question?

The main goal of my project was to describe here briefly the problem to be solved by the research, the starting hypothesis, and the questions addressed by the experiments. To explore and analyze the benefits that can be realized by applying the urban circular economy model with the help of systematic literature reviews or system dynamics modeling. To determine the macro- and micro environmental elements and processes that contribute to the success of cities based on circular material and energy flow. To highlight the general scenarios related to the future visions of cities and urbanized areas, proposed directions for future development by taking into account also production and competitiveness criteria.

Another question is whether it is possible to identify the impact of sub-areas and activities on the evolution of the urban spatial structure and patterns applying the circular economic model?

Which best practices can be generalized and adapted and how do they modify the spatial structure of urban operations?

What are the most effective policy instruments and how should they be implemented? Can lessons and recommendations be formulated in terms of modern urbanism and regional development? Based on the possible scenarios, how can cities be encouraged to implement circular principles?

The hypothesis to be proven is that different characteristics strongly influence the possibilities of a circular economic transition at the national and regional level, therefore a combination of several models and sub-areas may be optimal. The goal is to identify, organize and explore their driving forces.

The project relies on three innovative methods:

(1) big data-based literature review,
(2) network and system dynamic analysis of complex systems,
(3) extensive application of innovative future research procedures based on the systematic use of tacit knowledge.

What is the significance of the research?

Describing the new perspectives opened by the results achieved, including the scientific basics of potential societal applications. However also to describe the unique strengths of the proposal in comparison to the domestic and international competitors in the given field.
The challenges of the transition from a linear economy to a circular economy and related best practices are receiving more and more attention worldwide. Various factors, such as the replacement of fossil fuels with renewable energy sources, thereby reducing resource dependence, resilience, and the reduction of GHG emissions related to the green economic transition are essential conditions for fulfilling commitments related to the Sustainable Development Goals and the European Green Agreement. In the EU urbanization processes, the expansion of the circular economy (for example, the growing role of renewable energy, sharing economy, reuse centers, etc.) has become the focus of interest accelerated by the Covid-19 pandemic and the Russian-Ukrainian conflict. From the perspective of cities' strategies, the most important environmental, economic and social intervention today is the improvement of energy and resource efficiency.

The use of the conceptual framework and the results collected by analyzing large volumes of data make it possible to formulate conclusions based on scientific methods. In addition to international and domestic decision-makers and regional development experts, the results
can also be used as learning and teaching materials by universities. This is further strengthened by the selected best practices, their systematization, categorization and evaluation analysis. The uniqueness of the research is given by the transdisciplinary approach, and it even deals with less analyzed future questions, combining them with each other.

Scholars have recently given significant attention to the concept of circular economy as a way of maximizing resource management sustainably. This concept seeks to achieve this goal by reducing waste, extending product life, promoting material recycling, updating

productivity, and renewable energy systems. It has great potential to contribute to the economic, social, and environmental aspects of the tourism industry. By implementing circular economy practices across the entire tourism industry value chain, it can lead to a more sustainable, robust, safe, and inclusive way of travel. Scholars have studied circular economy from various perspectives, including climate change, economic and business perspectives, social perspectives, policy and governance perspective, and digital and technological perspective, to identify research gaps and highlight areas of consensus. Such studies have emphasized the importance of resource efficiency and reducing environmental impact, promoting recycling and reuse, decreasing the use of once-used plastics, and developing innovative solutions for sustainable tourism development. Overall, the potential for circularity in the tourism industry is enormous, and this bibliometric analysis will be a valuable resource for scholars, policymakers, and practitioners who want to deepen their understanding of the crucial habits of the circular economy in the context of tourism.

Tourism studies have delved into the circular economy from various angles, presenting a range of examples that show how it can significantly contribute to sustainable development. While literature highlights the ample opportunities for circular practices in the tourism sector, there is a notable lack of understanding about the evolving trends in circular economy research. This study aims to address this gap by providing a thorough overview of existing knowledge in circular economy literature as it relates to tourism. By conducting bibliometric analysis, the study aims to map out the research landscape, identify gaps, highlight areas of agreement, and propose potential directions for future research. This analysis is a valuable resource for academics, policymakers, and industry professionals looking to deepen their understanding of the crucial role of the circular economy in tourism. It offers insights into the current research landscape and sheds light on emerging areas of interest. (Moaaz Kabil, Al Fauzi Rahmat, Mihály Hegedüs, Bernadett Galovics, Lóránt Dénes Dávid, 2024)

The main result of this research is the exploration of the resource-oriented challenges and intervention possibilities of urbanization, scenarios and proposals. The innovative research methods make it possible to develop models that can be scaled and adapted with sufficient flexibility to understand the operation of regional circular concepts. The results help the actors of regional and urban development to develop a new scientific approach,

while the comprehensive analysis of the circular economy literature creates a basis for all future domestic and international research dealing with similar topics.

2. Theoretical background

2.1. Circular Economy concept, principles and its development

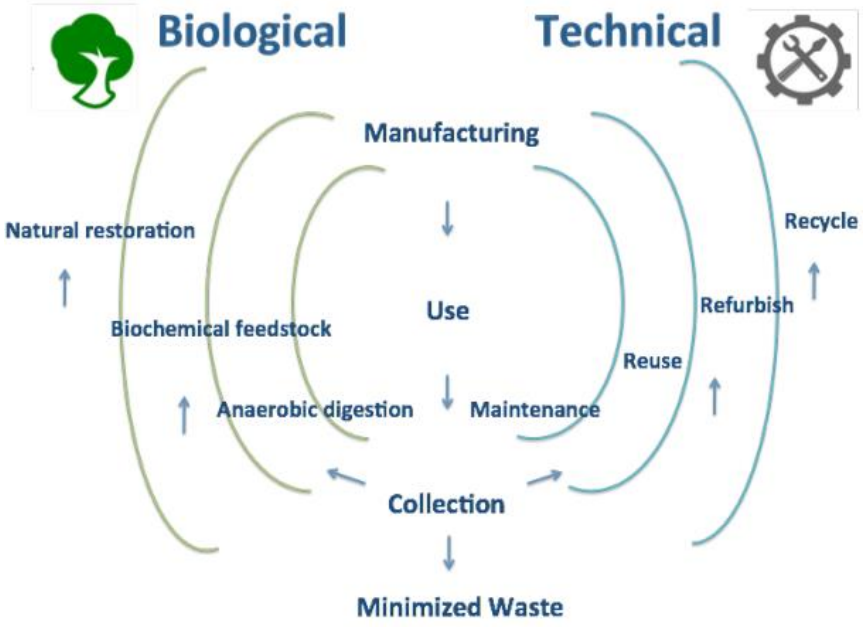
The concept of the Circular Economy offers an alternative beside the linear economic model which as it means the model of "reduce-reuse-recycle" in a circular way why the linear model consists of three steps which are "take-make-dispose". The focus of this circular model is sustainability, and it has two goals, from one side, it aims to reduce the quantity of waste, and from the other side, it aims to maximize the use of resources. The closed-loop thinking leads to the establishment of a regenerative economic system which operates in accordance with the ecological constraints of the planet. In order to reach the concept of the circular economy, the industries and the sectors have to work together but also innovation is needed beside collaboration, and in addition, regenerative and restorative planning (Geissdoerfer et al., 2020).

There are many definitions of the Circular Economy, in the current work I am going to introduce two of them. The interpretation of Geissdoerfer et al. is the following: *"The Circular Economy is a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, manufacturing, refurbishing, and recycling"* (Geissdoerfer et al., 2017).

According to Ellen MacArthur Foundation (2013, p. 7), the definition is the following: *"A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the "end-of-life" concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models."*

The Circular Economy aims to prolong the products' lifetime which can be achieved in two ways: one way is to use the given product for a longer period of time, and the other one way is to give a new life to the given product. In this concept, the lifetime of the products can be prolonged not only once but even more time until new value streams can be founded for them and for their components (Merli et al., 2018). According to another interpretation, the highest value and the highest utility of the products and the materials are kept in this concept, and there are two types of looping for that, one of them is through the technical life cycle

and the other one is through the biological life cycle. If we maintain, recover, restore, remanufacture or recycle the product and we prolong its lifetime through these activities, we are talking about the technical life cycle. In case of the biological cycle, renewable resources are regenerated and consumed, for example the degradation of the natural system. This can be reached through natural restoration, biochemical feedstock and anaerobic digestion. As we can see from the above explanation, the difference between these two life cycles is that in case of the technical one the flow refers to finite resources but in case of the biological one it means refers to the renewable resources as it is presented on Figure 1 (Ellen MacArthur Foundation, 2015).



1. Figure: The biological and the technical life cycle of the product

Source: Ellen MacArthur Foundation (2015, p. 6)

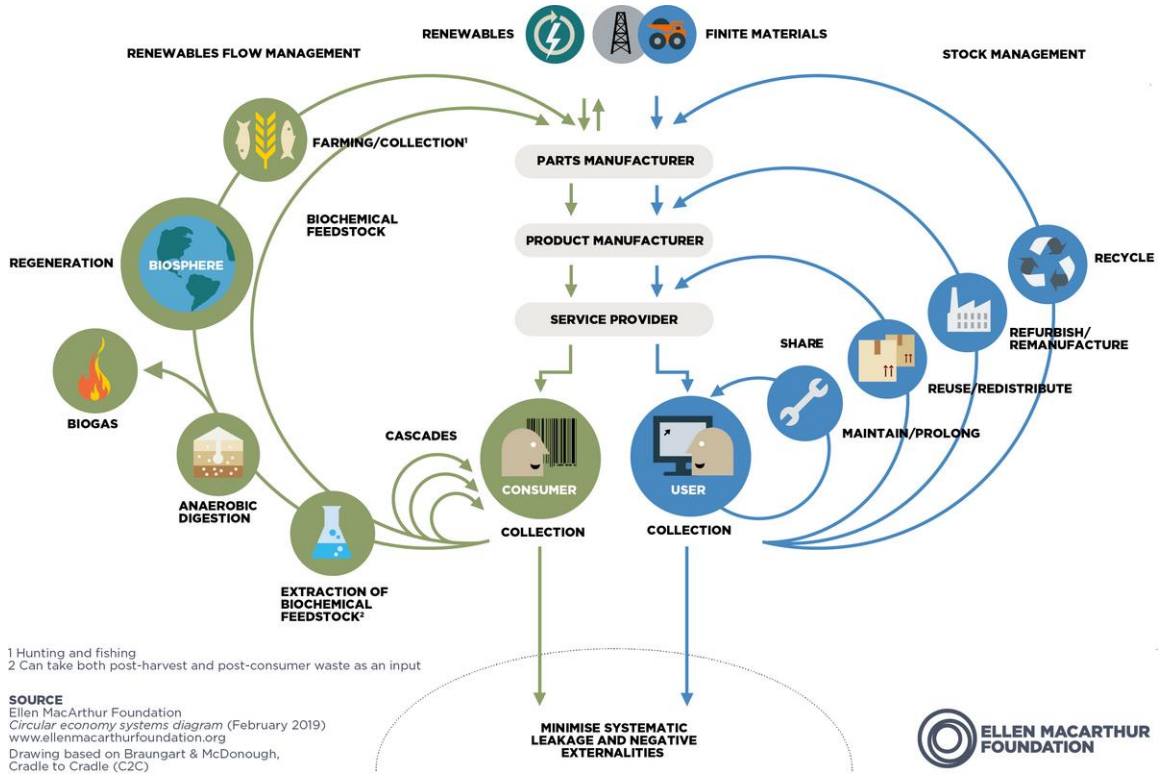
Depending on the size of the loop, the profitability differs: if we want to reach a high profitability, a smaller loop is needed. Based on the words of Stahel (2016, p. 1): *"replace production with sufficiency, reuse what you can, recycle what cannot be reused, repair what is broken, remanufacture what cannot be repaired"*. TU Delft (2017) has the same understanding, it highlights that prolonging is the key word in relation to the life time of the products: the most economical and effective way in relation to the existing product is to

choose the loop which requires the smallest change because in this case, capital, energy, labour and material costs can be decreased, in addition, even the number of negative externalities will be smaller.

As it has been explained earlier, we differ technical and biological nutrients in relation to the circular economy. In the concept, there is a significant difference between the consumption and the use of materials which highlights the importance of a functional service model where not the product itself is sold but only its use and the ownership is kept by the producers. There are many comprehensive frameworks which describe the concept of the Circular Economy, but in the current work, the principles of Ellen MacArthur Foundation will be introduced – this is the original framework which contains five principles in total (Ellen MacArthur Foundation, 2013):

- Design out waste: In case of both technical and biological components are designed as part of a product in order to be elements in its related material cycles, waste will not even exist. However, these two components have to be handled differently, as composting can be done easily in case of biological nutrients as they are non-toxic, the technical nutrients have to be designed in order to make reuse possible with low energy consumption and high quality.
- Resilience through diversity: Comparing to systems built only on efficiency, multiple systems are more resilient in case of significant external changes and shocks.
- Energy from renewable resources: The goal of the concept is to be dependent only on renewable resources.
- Thinking in systems: It is important to understand the relationship among the elements, the part and the whole in order to reach proportional input.
- Waste is food: Looping back into the biosphere is the point of this principle in case of biological components while technical components can be recycled through quality improvements. The aim of the Circular Economy is to use more biological components instead of technical ones.

Ellen MacArthur Foundation (n.a.) also presents the flows of the natural and the technical components in the process through the butterfly diagram in a detailed way which can be seen in the Figure 2.



2. Figure: The butterfly diagram of the Circular Economy

Source: Ellen MacArthur Foundation (n.a.)

Currently, the companies operate in an environment which is really complex, and which is full of technological improvements which cause significant changes and challenges for all organisations. If these companies want to cope with these challenges, their practices and strategies have to be rethought and reshaped (Murray et al., 2017). In addition, the current consumption and production systems are not sustainable as they mean a significant exploitation four our resources which causes a serious threat for the future: if the resources of the planet are exhausted, the needs of the future generations can not be fulfilled. The potential threats of both these patterns highlight the importance of sustainability in many ways. From this perspective, companies play an important role as many different capabilities and resources are dominated by them. However, it is difficult for the organisations – both for private and public ones – to operate effectively and achieve a stable financial performance while their environmental footprint becomes smaller (Porter & Kramer, 2011).

2.2. Circular Economy adoption theory, benefits and disadvantages

If the concept of the Circular Economy can be maintained, it would be beneficial for the society to and even for all organisations from social, environmental and economic perspectives, because it creates a closed-loop system where the players of the system utilise the resource as long as they can, and even they reduce their waste to the minimum level. The companies which follow this concept, manufacture products which can be reused, refurbished, repaired or recycled once their useful lives ended. Service-orientation also plays an important role in this concept as the companies aim to preserve and redeploy the resources and the materials. If an organisation decides to follow this concept, there are some requirements which have to be fulfilled: at first, clients and shareholders have to be involved and their cooperation is also needed, moreover, the organisation has to focus on supply chain management and product design. If the company wants to ensure that its product can be recycled and disassembled easily, its repairability, durability and longevity have to be ensured through product design. The role of supply chain is important because it supports the sustainable and ethical acquisition of raw materials (Ellen MacArthur Foundation, 2020).

Following the concept of Circular Economy, causes many benefits for the organisations, for example, they the negative effects of the external environment can be reduced, the productivity can be improved and even the costs can be decreased. The costs of the company in relation to waste disposal and raw materials can be decreased as a result of a proper product design. In addition, if it adopts a service-oriented approach, the retention and the satisfaction of the customer can be improved, moreover, new revenue streams can be created. It is also important for the companies to provide information to their customers regarding the related benefits and the related practices in the area of recycling, reuse and repair because their engagement also supports the implementation of the business model. In addition, the companies have to collaborate with all of their stakeholders, like regulators, customers and suppliers, because the collaboration of all shareholders is able to support the creation of the closed-loop system, and even it also supports to overcome the circularity related challenges (Accenture, 2018)

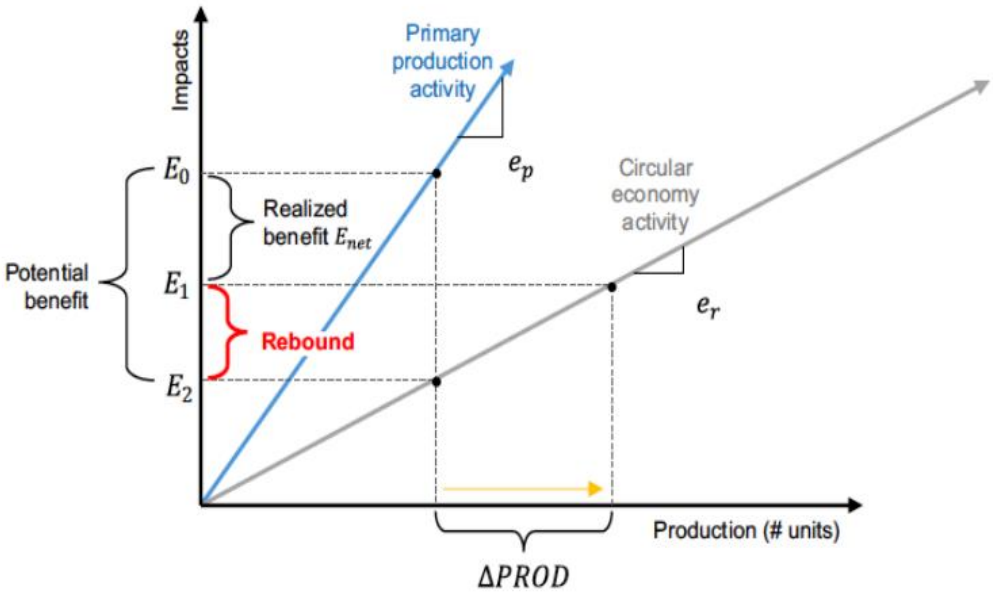
The benefits of the Circular Economy were listed by the European Parliament (2021). As benefit, the environmental pressure can be reduced. In relation to the availability of raw materials, security will be improved, and even competitiveness will be improved, while GDP will be increased. According to the expectations, the Circular Economy will create

approximately 700,000 jobs in the European Union by 2030. The quality of life of the consumers will be better as they can save money due to more innovative and durable products.

Sariatli (2017) also summarized the benefits of the Circular Economy. According to him, the organisations can gain potential competitive advantage based on the reuse of material resources. If it transforms the waste in the value chain, it brings quantifiable benefits by reducing direct material costs and even resource dependence. The company will be able to increase its material use and develop more durable products with better quality by applying Circular Economy business model and integrate research & development. In attrition, externalities can be closely related to material consumption and material flow, and this is the reason why the lower material consumption reduced the exposure to externalities. Due to the closed cycle processes, the economy will be less exposed to the price fluctuations of raw materials, and the levelized cost curve ultimately results the more efficient use of resources both in terms of value and quantity. In addition, there are three opportunities in relation to the adoption of the Circular Economy. One of them is that with the decrease in the amount of general material consumption, national economies could be saved more billion dollars on an annual basis which means approximately 600 billion dollars per year at the level of the European Union. If the company ensures the application of recyclability in case of technical products even during product design, it will gain access to cheaper materials with better quality. Moreover, the development of an appropriate knowledge base in relation to the Circular Economy, in order to answer all legal, technical, operational and cross-sectoral issues, it would open new business opportunities for entrepreneurs and users.

Regarding the disadvantages, Zink and Geyer (2017) highlight that consumption patterns can be shifted as the consequence of the Circular Economy, because the activities of this concept is not able to rival with the lower prices and primary production. Comparing primary and secondary products, we also have to investigate quality: the quality is always higher in case of primary products, and from the perspective of quality, secondary products are not able to compete with the primary ones effectively. For example, on the market of smartphones, technological changes are common, and this is the reason why a second-hand market can not be successful. In this case, refurbished phones are not able to replace the new smartphones, they only mean an addition to them which causes that both production and consumption increase. Additionally, the secondary products are sold at a lower price due to

their lower quality, however, it might cause that the downstream producers decide to purchase more materials and produce more final products which could be purchased cheaper in the market, and it motivates consumers to purchase more final products. There are many benefits of using secondary materials, but if their use causes the increase of production and consumption, the negative effects might offset the benefits. If the companies do not send the prices of secondary products intentionally at a lower level, it also could cause the same effect: if the prices are formed only by the amount of available products, in case of a large amount of available primary and secondary products, the prices of both types of products will be decreased. Based on this effect, the expected environmental benefits of the Circular Economy will be lower due to the consequence of the economic growth. The so-called rebound effect is presented on Figure 3 which explains that the increased production causes lower environmental benefits and only if there aren't any productional increase, the companies will achieve full potential benefit (Zink & Geyer, 2017).



3. Figure: Rebound effect in the Circular Economy

Source: Zink & Gever (2017)

Sariatli (2017) also listed the weaknesses in relation to the Circular Economy. He mentions that there aren't any actual guidelines for the various economic sectors on circularity for the practical realization of the economy, moreover, currently there is no international institution which controls the regulation of the sector. There is no adequate legal regulation for the concept and the operation of the Circular Economy. The Circular Economy does not consider

the possibilities of partial recycling of raw materials which are used in the production process. The public opinion is not really informed about the possibilities of the Circular Economy and its operation, even the employees of the related sectors are difficult to reach and inform. There is another difficulty mentioned by Sariatli: due to the low volume of financial investments in the Circular Economy, the interest of the current market participants is low towards this opportunity. In addition, Van Ewijik (2014) highlights that the Circular Economy requires the connection of the full product life cycle starting from raw material supply to destruction. According to Sariatli (2017), there are also some threats in relation to the Circular Economy. If companies are able to manage entire product life cycles, they would easily know how to support activities that lead to high prices and unsuitable products. If the manufacturers manage their own waste use, it will be difficult for the external processors and production units to get the needed raw materials. The management of entire product life cycles and the close cooperation with direct partners might lead to the formation of cartel structures. In the Circular Economy, the recurring or larger financial disruptions which occur in one place might spread to closely related companies, sectors and even the whole industry.

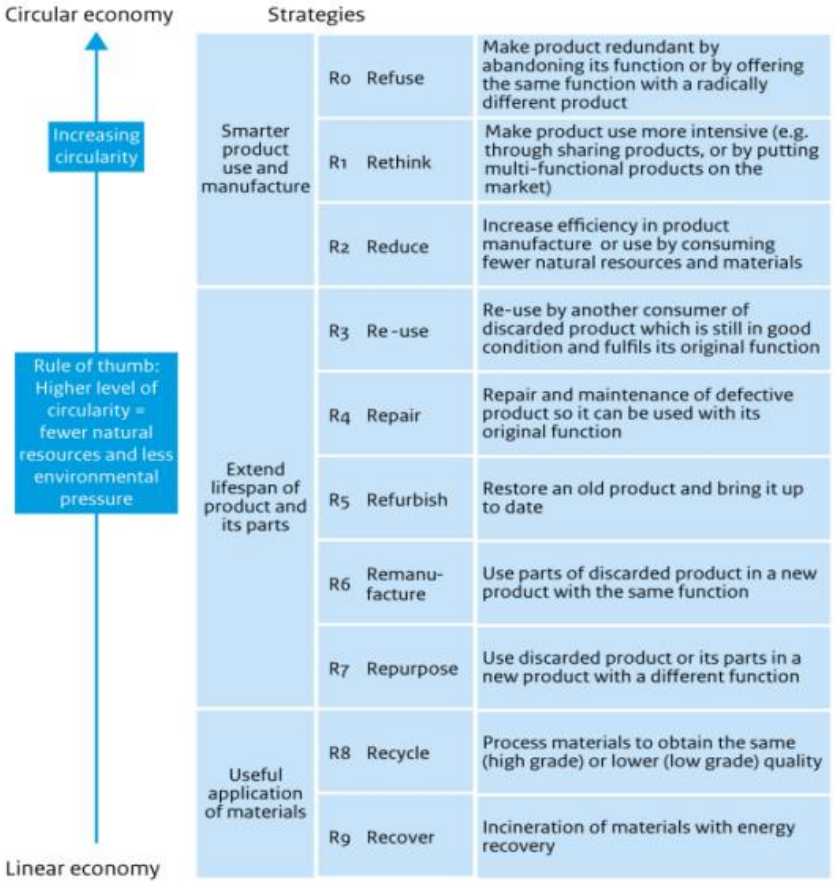
2.3. Circular Economy strategies

As it has been already presented, the Circular Economy has three major goals: to optimize the use of resources, to reduce waste, and even to support sustainable production and consumption practices. The strategies of the Circular Economy support the achievement of these goals, as they encourage innovation from the perspective of consumption and production which could lead to sustainability and less waste. In addition, a more sustainable approach of resource management should be supported by them (Geissdoerfer et al., 2017).

There are different frameworks in relation to the strategies, in the current paper, I am going to present the research of Potting et al. (2017) as it is often applied by the researchers, in addition, many frameworks are based on this research. According to Potting et al. (2017), there are three stages in relation to the strategies based on the goal of the organisation:

- If the goal is reach to reach ***smarter product use and manufacture***, it will include three activities, refuse (R0), Rethink (R1) and Reduce (R2).
- If the organisation wants to ***prolong the lifespan of the product and its components***, it has to proceed five activities: Re-use (R3), Repair (R4), Refurbish (R5), Remanufacture (R6) and Repurpose (R7). Strategies can also aim ***the useful***

application of the materials which consists of two activities: Recycle (R8) and Recover (R9).



4. Figure: The strategies the Circular Economy

Source: Potting et al. (2017)

Beside supporting the achievement of the related goals, there are also other benefits in relation to the Circle Economy: through the innovative practices, technologies and business models, it can support economic expansion and job growth and even the creation of new business opportunities. Considering above mentioned benefits with the decreased costs, many companies are willing to adopt a Circular Economy strategy (Stahel, 2016).

In order to choose the strategy to follow, the organisations have to analyse the three stages of strategies in order to decide which one is the most appropriate for them. There are different factors which affects the determination of the strategy besides the characteristics of the organisation: the sector and the industry. In addition, there is a model which supports the decision making called Value Hill model. The model provides information to the organisations how their value chain, their strategy and their business can be evaluated from

the perspective of the Circular Economy. Three phases of the product life cycle is presented in the model: pre-use, use and post-use, in addition, there is an ascending and a descending movements in the model (Inchainge, 2023).

5. Figure: The Value Hill model

Source: Inchainge (2023)

2.4. Circular Economy business models (CEBMs)

Business models play an important role in the operation of the organisations because they support them to become circular, and this is the reason why many organisations developed new types of business models. These models are expected to redefine the value propositions and maintain the effective production (Schulte, 2013).

The definition of Geissdoerfer et al. (2018, p. 713) says that the CEBMs *"which are business models that aim at solutions for sustainable development by creating additional monetary and non-monetary value by the pro-active management of multiple stakeholders and incorporate a long-term perspective – that are specifically aiming at solutions for the Circular Economy through a circular value chain and stakeholder incentive alignment"*.

One of the most popular frameworks in relation to Circular Economy business models is the so-called RESOLVE framework which contains six approaches which is presented on Figure 6: Regenerate, Share, Optimize, Loop, Virtulize and Exchange (Ellen MacArthur Foundation, 2015). There are other types of business models, for example, circular supply chains, loops, resource recovers, product life extension and sharing platforms (Rosa et al., 2019). Implementing a CEBM which support the organisations to join the circularity system is challenging for them and they have to create value even after the required changes. Moreover, the factors which influence the operation of the circular system have also be

investigated and analysed in order to solve all potential issues (Guldmann & Huulgaard, 2020).

6. Figure: RESOLVE framework

Source: Ellen MacArthur Foundation (2015)

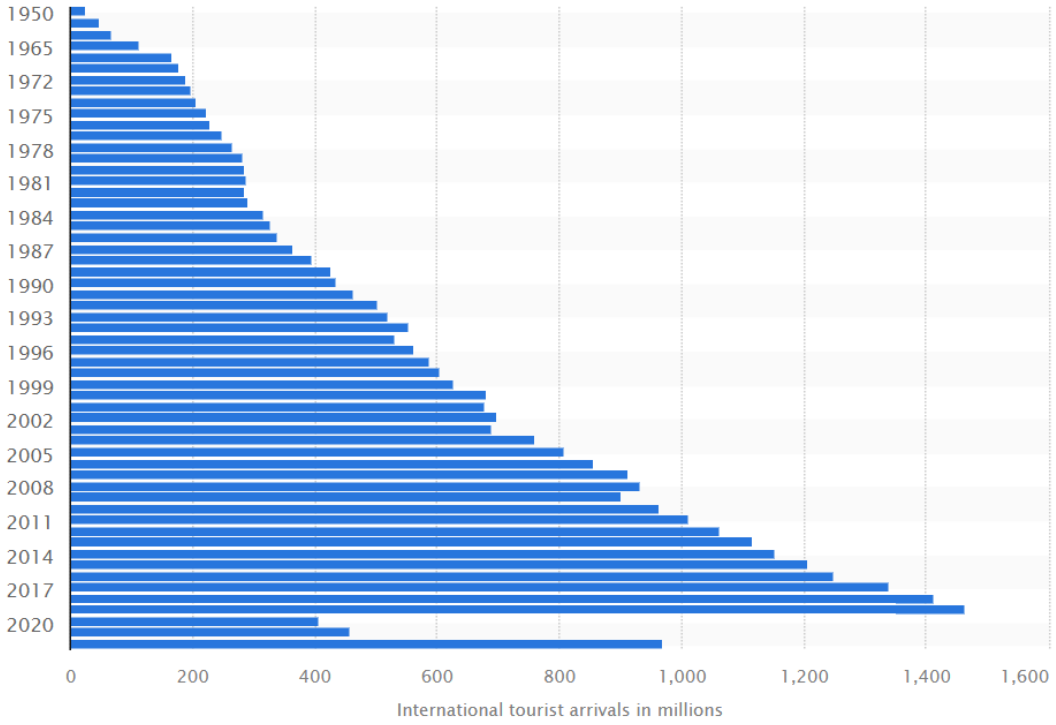
2.5. Circular Economy and Tourism

As part of this chapter, I will present the relationship of tourism and sustainability, the necessity of Circular Economy in tourism, the transition to circular tourism, the tourism value chain, the challenges and best practices, and even the circularity framework in tourism.

2.5.1. Tourism and sustainability

The definition of sustainable tourism is the following: *"tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment, and host communities"* (UNWTO, 2021). Tourism can be developed on a sustainable way if socio-cultural, economic, environmental dimensions are handled in accordance which means that sustainable tourism fights against poverty, secure employment opportunities, support the social and economic development on a long-term basis. In addition, the cultural and social authenticity of the destination is respected in sustainable tourism, while the biodiversity and the natural heritage is protected (UNWTO, 2021).

Tourism develops rapidly, however, its development stopped due to COVID-19 for a while. It has already restarted and according to the expectations, it will almost reach the 2019 numbers (it will be around 5% below until the end of 2023), actually, the tourism of 34 countries already performs better than in 2019 (World Travel & Tourism Council, 2023). Regarding the number of tourists, the peak was 1463.68 million people in 2019 and after a significant decrease in 2020 and 2021, it increased to 696.4 million people (Statista, 2023).



7. Figure: Number of international tourist arrivals worldwide from 1950 to 2022

Source: Statista (2023)

In accordance with the fast development of the sector, we have to mention that from one side, the economic and social status is contributed, from the other side, the natural environment is degraded due to tourism. Moreover, one of the post-polluting sectors is tourism, it affects the environment in many ways, for example, the CO2 emission is high due to travel, and tourists also use natural resources during their trips (Vecchio et al. 2021).

UNECE (2021) investigated the tourism hotspots which means that in any impact category the environmental impact contributes to more than the half of total lifecycle effect across all product and service lifecycle stages, in case of warm spots the contribution is 25-30% and in case of cold spot it is under the average. The tourist element which has the most hotspots is accommodation – operations, except biodiversity, all environmental categories are

hotspots: energy use, water use, other resource use, waste and climate change, and there is one tourist element which has only cold spots: services which covers booking services, financial services, travel agencies and tour operators (One Planet Network, 2019).

2.5.2. Necessity of Circular Economy in Tourism

The first attempt to create tourism sustainable started before the millennial but they were not successful. The operation of tourism is a linear model which relies on a lot of resources, and in addition, it generates a lot of waste and greenhouse gases. It is recognized that the concept of the Circular Economy in tourism would have many advantages, for example, innovation would be supported, the impact of tourism on climate change could be decreased due to the longer life cycle and the use of renewable resourced. Besides tourism, the concept would be profitable even for the destinations as they could be developed on a sustainable way as well (Kurtagic, 2021).

Applying the concept, CO2 emissions, waste and even the consumption of natural resources could be decreased that the flow of materials would be monitored strictly for example, in relation to water, food, energy and construction. As another advantage, innovations would be promoted, and green jobs would be added to the local economy. If the concept is applied properly, it would support both gaining profitability and achieving sustainable goals (Manniche et al., 2017).

2.5.3. Transition to circular tourism

COVID-19 had a significant impact on tourism which highlighted the vulnerability of the sector, and due to its consequences and even due to other challenges, the need for a green economy emerged. With the application of the Circular Economy concept, the low-carbon economic future can be achieved in an integral way. At first, the concept started to spread in the manufacturing sector, but recently even the service sector including tourism realised its potential (Vargas & Sanchez, 2018).

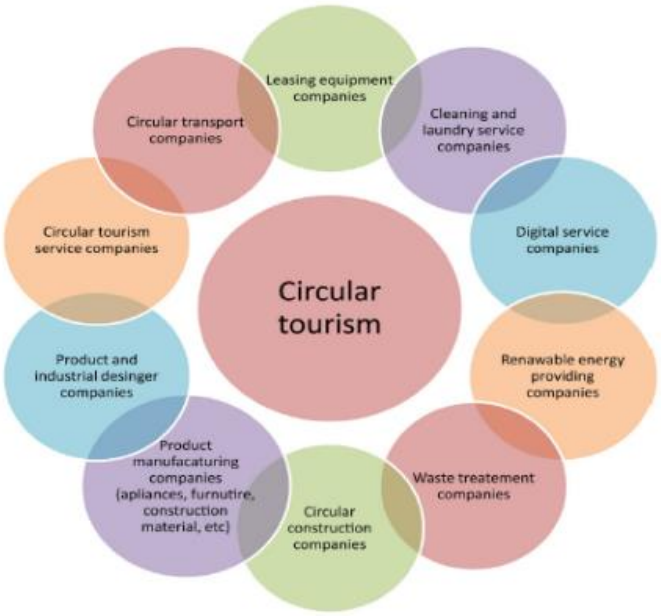
In case of tourism, the transition to circular is supported by new business models, new product innovations and even new tourism services. If the sector applies the business ideas from the industrial field which are effective there, it will support the transition. There are five principles which can be applied by tourism (Pan et al., 2018):

- new consumption and production models in relation to energy, food and water
- waste reduction by Circular Economy concept

- use of biodegradable products in order to conserve the environment and the biodiversity
- preservation of the culture and cultural values creation
- greening the industry

2.5.4. Tourism value chain

In relation to tourism, value chain starts before the travel, for example, if the tourist makes a reservation at a hotel or book flight tickets. The value chain contains four additional elements after the arrival to destination: transportation, accommodation, food and place-based activities. From the perspective of value chain, even the support of infrastructure is crucial as infrastructure is needed to the proper operation of the tourism industry and all of them have to work properly (Zorpas et al., 2021). There is another important requirement regarding the application of the Circular Economy concept: one company is not enough to execute the transformation but the cooperation among many different companies is also needed as it is presented on Figure 8 (Kurtagic, 2018).



8. Figure: An example of applying CE concept in tourism

Source: Kurtagic (2018)

2.5.5. Challenges and best practices

There are main efforts concentrate on recycling measures, water and energy in relation to sustainable tourism. In the South Baltic region, circular tourism has been studied through

the CIROTINO project, and as the findings of the project, the 3R principles have been introduced which has been created based on the experiences of South Baltic hotels in relation to sustainability (Lindell et al., 2019):

- reuse practices: Old historic buildings can be reused as tourist facilities as it is done in Albert Dock the United Kingdom, and in Paradores, Spain. An Estonian hotel called Looming organises trainings for its employees in order to provide information regarding their environmental responsibilities, guests are also encouraged to respect the environment, moreover, the 99% of the existing furniture was reused.
- reduce practices: An Austrian hotel called Stadthalle uses solar panels and this is the reason why it is able to produce energy which is needed for them for the whole year. There is a food waste monitoring software in the United Kingdom called Winnow: this software supports kitchens to reduce food waste by providing real-time data.
- recycle practices: The 97% of the hotel waste is recycled in an Irish hotel called Sandymount.

2.5.6. Circularity framework in tourism

The strategies and the core elements will be presented based on the research of Potting et al. (2017):

- prioritize regenerative sources:
    - refuse: For example, hotels can provide reusable containers instead of single-use plastics to offer water for the guests (CEnTour, 2020).
    - reduce: Collaborating with local suppliers could reduce transportation (CEnTour, 2020).
    - rethink: Conventional energy could be substituted by renewable energy (Rodriguez et al., 2020).
- stretch the lifetime:
    - reuse: For example, textiles, bottles and containers can be reused (Florido, 2019).
    - refurbish/repair: New hotel facilities can be made from old buildings through refurbishment (Manniche et al., 2017).
- use waste as a resource:
    - repurpose: Buildings which are disused can be important part of sustainable tourism (Nedyalkova, 2019).
    - recycle: Food waste coming from tourism and which are not suitable for human consumption could be composted (CEnTour, 2020).

3. Research methodology

This chapter has two parts, at first, I am going to present the hypotheses of the research, and then, the research methods will be introduced.

3.1. Hypotheses

In total three hypotheses have been investigated through the primary research:

H1: The circular economy in rural areas can positively promote efficiency and sustainability in the region.

H2: Best practices implemented in rural areas can also modify the spatial structure of urban areas in a positive way.

H3: The most effective policy instruments and their implementation methods should be identified and prioritized.

H4: Lessons and recommendations can be formulated in terms of modern rural development and regional sustainability.

H5: Rural development can be more sustainable if circular principles are implemented.

3.2. Research methods

As primary research, I applied quantitative research in order to reach many members of the target group and get conclusions based on the answers. The presented hypotheses have been investigated based on the results of the questionnaire.

The questionnaire I created contained four parts: at the beginning, I listed some demographic questions, and then, the hypotheses have been examined through a five-points Likert-scale. In the third part of the questionnaire I provided a quiz regarding sustainable tourism in general and in relation to North Hungary. In the last part, I asked 15 open questions regarding sustainability and sustainable tourism. The questionnaire contained both closed and open questions. Among open questions, I applied two types: one choice question and five-points Likert scale. The goal of the questionnaire was to get to know and understand the knowledge of the answerers in relation to sustainability, sustainable tourism in general, and sustainable initiatives in North Hungary in tourism.

The primary research targeted all people around the world but in the questionnaire, I grouped them in four groups based on their answers: North Hungary, other parts of Hungary, Europe

(outside Hungary) and outside Europe. As the target group lives all over the world, I made the questionnaire available online and shared the questionnaire in many tourism related groups on Facebook. I applied convenience sampling. My goal was to get at least 200 filled questionnaire but the sample size was 218. The answers of the questionnaire were analysed with SPSS. I presented the results through descriptive statistics.

Hypothesis':

1. The circular economy in rural areas can positively promote efficiency and sustainability in the region.

The circular economic model has the potential to reveal the impact and activities in rural areas. By applying this model to rural development strategies, policymakers can better understand how these practices can positively modify rural areas and promote efficiency and sustainability in the broader region.

2. Best practices implemented in rural areas can also modify the spatial structure of urban areas in a positive way.

The implementation of best practices in rural areas can also serve to positively modify the spatial structure of urban areas. This is due to the fact that such practices can lead to greater efficiency and sustainability in the surrounding regions, which can in turn provide benefits to urban areas that rely on them for resources and services. By leveraging the strengths of both rural and urban areas, it is possible to create a more cohesive and functional system that benefits all stakeholders. Therefore, it is important for policymakers to consider the potential impact of rural development strategies on urban areas, and to take steps to ensure that they are aligned with broader regional goals and objectives.

3. The most effective policy instruments and their implementation methods should be identified and prioritized.

Identifying and prioritizing the most effective policy instruments and implementation methods is crucial in modifying urban spatial structure in a positive and sustainable way. By incorporating best practices and sustainable practices, it may be possible to achieve this goal and create a more environmentally-friendly and community-oriented urban area.

4. Lessons and recommendations can be formulated in terms of modern rural development and regional sustainability.

(It can be reasonably posited that lessons and recommendations can be devised in regards to contemporary rural development and regional sustainability. By prioritizing sustainable practices and fostering the growth of rural areas, it is conceivable that a more equitable and ecologically sound future could be attained. Nevertheless, additional research and analysis would be required to comprehensively evaluate this hypothesis and determine the optimal strategies for achieving these objectives.)

5. Rural development can be more sustainable if circular principles are implemented.

Based on the context provided, it seems plausible to hypothesize that rural development can indeed be more sustainable if circular principles are implemented. Circular practices, such as recycling, reducing waste, and promoting local resource utilization, can help rural communities to become more self-sufficient and less reliant on external resources. This can lead to a more sustainable and resilient rural economy, which benefits both the local community and the broader tourism industry. However, further research would be needed to fully test and validate this hypothesis.

Even to the questionnaire during my research work I have put this hint for the responders:

The circular economy is an economic system that aims to minimize waste and promote sustainability. Circular tourism, on the other hand, is a type of tourism that promotes sustainable and responsible travel practices. In North Hungary, there are several initiatives and programs that support circular tourism and the circular economy. For example, local businesses are encouraged to adopt sustainable practices and reduce waste, while tourists are encouraged to explore the region's natural beauty and cultural heritage in a responsible and sustainable way. By embracing the principles of the circular economy and circular tourism, North Hungary is creating a more sustainable and resilient future for its residents and visitors alike.

4. The results of the primary research

The results of the questionnaire will be presented in four parts: demographic questions, hypotheses, quiz questions and open questions.

4.1. Demographic questions

At the beginning of the questionnaire, I had the demographic questions. Investigating the age of the respondents, we can see that 44% of them is between 18 and 25 years old, 19.3% of them is between 35 and 45 years old, 16.5-16.5% of them is between 25 and 35 years old or above 45 years old, and the 3.7% of the sample is under 18 years.

Your age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<18	8	3,7	3,7	3,7
	18-25	96	44,0	44,0	47,7
	25-35	36	16,5	16,5	64,2
	35-45	42	19,3	19,3	83,5
	45<	36	16,5	16,5	100,0
	Total	218	100,0	100,0	

1. Table: The age of the respondents

Source: own research and compilation (2023), N=218

Regarding gender, the 57.8% of the sample are female, and its 42.2% are male.

Your gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	92	42,2	42,2	42,2
	female	126	57,8	57,8	100,0
	Total	218	100,0	100,0	

2. Table: The gender of the respondents

Source: own research and compilation (2023), N=218

The ratios of the answerers based on their highest educational qualification is the following: 51.4% university, 31.2% high school, 9.2% college, 4.6% vocational school, 1.8% PhD, 0.9-0.9% primary school.

Your highest educational qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary school	2	,9	,9	,9
	High school	68	31,2	31,2	32,1
	Vocational school	10	4,6	4,6	36,7
	Technician	2	,9	,9	37,6
	College	20	9,2	9,2	46,8
	University	112	51,4	51,4	98,2
	PhD	4	1,8	1,8	100,0
	Total	218	100,0	100,0	

3. Table: The highest educational qualification of the respondents

Source: own research and compilation (2023), N=218

The answerers shared their current professions which have been classified into four categories: the 62.8% of the respondents is white-collar worker, the 19.0% of them are students, the 0.9-0.9% of them are blue-collar worker or not working, and the 20.2% of the sample did not answer the question.

Your current profession

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	student	33	15,1	19,0	19,0
	white-collar worker	137	62,8	78,7	97,7
	blue-collar worker	2	,9	1,1	98,9
	not working	2	,9	1,1	100,0
	Total	174	79,8	100,0	
Missing	System	44	20,2		
Total		218	100,0		

4. Table: The current profession of the respondents

Source: own research and compilation (2023), N=218

The questionnaire also investigates where the answerers are from. I grouped the answers into four categories: the 34.9% of them is from Northern Hungary, the 39.4% of them from other parts of Hungary, the 11.9% of then from Europe (outside Hungary), and the 13.8% of them from other countries.

You are from

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Northern Hungary	76	34,9	34,9	34,9
	Other part of Hungary	86	39,4	39,4	74,3
	Europe, outside Hungary	26	11,9	11,9	86,2
	Other	30	13,8	13,8	100,0
	Total	218	100,0	100,0	

5. Table: You are from

Source: own research and compilation (2023), N=218

The next question investigates where the respondents currently living in. The 35.8% of them respondents live in Northern Hungary, the 39.4% of them in other parts of Hungary, the 12.8% in Europe, outside Hungary, and the 11.8% in other countries.

You are currencly living in

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Northern Hungary	78	35,8	35,8	35,8
	Other part of Hungary	86	39,4	39,4	75,2
	Europe, outside Hungary	28	12,8	12,8	88,1
	Other	26	11,9	11,9	100,0
	Total	218	100,0	100,0	

6. Table: You are currently living in

Source: own research and compilation (2023), N=218

4.2. Hypotheses

The next question investigates how the answerers agree with the hypotheses on a five-point Likert scale. Investigating the means for each hypothesis, we can see that all of them are between 3.51 and 4.50 which means that the respondents rather agree to them in general. The standard deviation is around 1.00 in all cases which is a high value, and it means that express how much the members of a group differ from the mean value for the group. The mode is 5.0 is two cases which means that the most answerers totally agree to the hypotheses H3 and H5.

Statistics

		H1: The circular economy in rural areas can positively promote efficiency and sustainability in the region.	H2: Best practices implemented in rural areas can also modify the spatial structure of urban areas in a positive way.	H3: The most effective policy instruments and their implementation methods should be identified and prioritized.	H4: Lessons and recommendations can be formulated in terms of modern rural development and regional sustainability.	H5: Rural development can be more sustainable if circular principles are implemented.
N	Valid	218	218	218	218	218
	Missing	0	0	0	0	0
Mean		4,0000	4,0550	4,0826	3,9266	4,0459
Median		4,0000	4,0000	4,0000	4,0000	4,0000
Mode		4,00	4,00	5,00	4,00	5,00
Std. Deviation		,94063	,88858	,97080	1,05783	1,00125
Percentiles	25	4,0000	4,0000	3,0000	3,0000	3,0000
	50	4,0000	4,0000	4,0000	4,0000	4,0000
	75	5,0000	5,0000	5,0000	5,0000	5,0000

7. Table: The hypotheses

Source: own research and compilation (2023), N=218

The detailed answers have been also examined in relation to the hypotheses:

- H1: The circular economy in rural areas can positively promote efficiency and sustainability in the region: The 32.1% of the answerers totally agree to H1, the 45.9% of them rather agree, the 13.8% is neutral, the 6.4% of them rather disagree and the 1.8% totally disagree.
- H2: Best practices implemented in rural areas can also modify the spatial structure of urban areas in a positive way: The 33.0% of the answerers totally agree to H2, the 46.8% of them rather agree, the 14.7% is neutral, the 3.7% of them rather disagree and the 1.8% totally disagree.
- H3: The most effective policy instruments and their implementation methods should be identified and prioritized: The 42.2% of the answerers totally agree to H3, the 31.2% of them rather agree, the 21.1% is neutral, the 3.7% of them rather disagree and the 1.8% totally disagree.
- H4: Lessons and recommendations can be formulated in terms of modern rural development and regional sustainability: The 33.0% of the answerers totally agree to H4, the 41.3% of them rather agree, the 15.6% is neutral, the 5.5% of them rather disagree and the 4.6% totally disagree.
- H5: Rural development can be more sustainable if circular principles are implemented: The 41.3% of the answerers totally agree to H5, the 30.3% of them rather agree, the 22.9% is neutral, the 2.8% of them rather disagree and the 2.8% totally disagree.

4.3. Quiz questions

The next ten questions of the questionnaire were a quiz. At first, the answers will be presented through descriptive statistics, and then, the results will be evaluated as well. The first quiz question asks the primary objective of the circular economy initiative in North Hungary. Almost the two-third of the respondents know the right answer which is to promote sustainable practices and reduce waste.

1. What is the primary objective of the circular economy initiative in North Hungary?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) To increase waste and pollution	24	11,0	11,0	11,0
	b) To promote sustainable practices and reduce waste	142	65,1	65,1	76,1
	c) To prioritize economic growth over environmental responsibility	52	23,9	23,9	100,0
	Total	218	100,0	100,0	

8. Table: What is the primary objective of the circular economy initiative in North Hungary?

Source: own research and compilation (2023), N=218

The second quiz question asks how businesses are in the region encouraged to adopt sustainable practices. Almost the three-fourth of the answerers know the right answer which is through incentives and support for eco-friendly projects.

2. How are businesses in the region encouraged to adopt sustainable practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) Through punishment and fines for not being eco-friendly	36	16,5	16,5	16,5
	b) Through incentives and support for eco-friendly projects	160	73,4	73,4	89,9
	By ignoring their impact in the environment	22	10,1	10,1	100,0
	Total	218	100,0	100,0	

9. Table: How are businesses in the region encouraged to adopt sustainable practices?

Source: own research and compilation (2023), N=218

The third quiz question was that are some responsible and sustainable ways for tourists to explore Northern Hungary's natural beauty and cultural heritage? The 84.4% of the respondents know the right answer which is by supporting local businesses that prioritize sustainability.

3. What are some responsible and sustainable ways for tourists to explore North Hungary's natural beauty and cultural heritage?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) By driving gas-guzzling cars and leaving trash behind	18	8,3	8,3	8,3
	b) By supporting local businesses that prioritize sustainability	184	84,4	84,4	92,7
	c) By taking a helicopter tour and disrupting wildlife habitats	16	7,3	7,3	100,0
	Total	218	100,0	100,0	

10. Table: What are some responsible and sustainable ways for tourists to explore North Hungary's natural beauty and cultural heritage?

Source: own research and compilation (2023), N=218

In the next question I asked the respondents what percentage goal has been established by the EU action plan for social economy for the recycling of packaging by the year 2030. According to the answers, the 42.2% of the respondents think that it is 75.0%, the 35.8% of them think that it is 50%, and according to the 22.0% of them it is 30%.

4. What percentage goal has been established by the EU action plan for social economy for the recycling of packaging by the year 2030?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) 30%	48	22,0	22,0	22,0
	b) 50%	78	35,8	35,8	57,8
	c) 75%	92	42,2	42,2	100,0
	Total	218	100,0	100,0	

11. Table: What percentage goal has been established by the EU action plan for social economy for the recycling of packaging by the year 2030?

Source: own research and compilation (2023), N=218

According to the 58.7% of the respondents, the 400% is the growth rate of renewable capacity which is considered the fastest growing energy source. The 32.1% of the respondents think that it is 10%, and the 9.2% of them think that it is 700%.

5. In the last 10 years, what has been the growth rate of renewable installed capacity, which is considered the fastest growing energy source?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) 100%	70	32,1	32,1	32,1
	b) 400%	128	58,7	58,7	90,8
	c) 700%	20	9,2	9,2	100,0
	Total	218	100,0	100,0	

12. Table: In the last 10 years, what has been the growth rate of renewable installed capacity, which is considered the fastest growing energy source?

Source: own research and compilation (2023), N=218

In the next question, I asked the answerers what are some benefits of circular economy practices in rural areas. The 78.0% of them know the right answer which is reduced environmental impact and improved resource efficiency.

6. What are some benefits of circular economy practices in rural areas?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) increased pollution and waste	18	8,3	8,3	8,3
	b) reduced environmental impact and improved resource efficiency	170	78,0	78,0	86,2
	c) decreased access to resources and limited economic growth	30	13,8	13,8	100,0
	Total	218	100,0	100,0	

13. Table: What are some benefits of circular economy practices in rural areas?

Source: own research and compilation (2023), N=218

The 71.6% of the respondents know that composting organic waste and recycling plastic bottles are circular economy practices while dumping waste in landfills is not.

7. Which of the following is NOT a circular economy practice?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) composting organic waste	20	9,2	9,2	9,2
	b) recycling plastic bottles	42	19,3	19,3	28,4
	c) dumping waste in landfills	156	71,6	71,6	100,0
	Total	218	100,0	100,0	

14. Table: Which of the following is NOT a circular economy practice?

Source: own research and compilation (2023), N=218

The next question investigates the potential challenge when it comes to implementing circular economy in rural areas. The correct answer here is limited access to infrastructure

and resources which is known only by the 38.5% of the respondents. Another 38.5% of them think that the potential challenge is the lack of interest in sustainability and circular economy practices.

8. What is a potential challenge when it comes to implementing circular economy in rural areas?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) Limited access to infrastructure and resources	84	38,5	38,5	38,5
	b) Abundance of resources and infrastructure	50	22,9	22,9	61,5
	c) Lack of interest in sustainability and circular economy practices	84	38,5	38,5	100,0
	Total	218	100,0	100,0	

15. Table: What is a potential challenge when it comes to implementing circular economy in rural areas?

Source: own research and compilation (2023), N=218

The next question investigates which of the following is an example of circular tourism in rural areas. The correct answer here is encouraging visitors to use local transportation and stay in locally owned accommodations. The 80.7% of the respondents know the right answer to this question.

9. Which of the following is an example of circular tourism in rural areas?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) Building a new hotel in a rural area	24	11,0	11,0	11,0
	b) Encouraging visitors to use local transportation and stay in locally owned accommodations	176	80,7	80,7	91,7
	c) Encouraging visitors to bring their own food and supplies	18	8,3	8,3	100,0
	Total	218	100,0	100,0	

16. Table: Which of the following is an example of circular tourism in rural areas?

Source: own research and compilation (2023), N=218

The next question asks what are some specific circular economy practices that may be relevant in rural areas. The 73.4% of the respondents know the right answer which is composting, using renewable energy sources, and promoting sustainable agriculture practices.

10. What are some specific circular economy practices that may be relevant in rural areas?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) Composting, using renewable energy sources, and promoting sustainable agriculture practices	160	73,4	73,4	73,4
	b) Increasing waste production and relying on non-renewable resources	26	11,9	11,9	85,3
	c) Ignoring the impact of human activity on the environment	32	14,7	14,7	100,0
	Total	218	100,0	100,0	

17. Table: What are some specific circular economy practices that may be relevant in rural areas?

Source: own research and compilation (2023), N=218

In the next question I asked the participants of the survey to mark an example of circular economy in a rural business from three listed answers. The 85.3 of them know the correct answer which is a farm that uses organic and sustainable practices and sells their products locally.

11. Which of the following is an example of circular economy in a rural business?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) A farm that uses pesticides and synthetic fertilizers	16	7,3	7,3	7,3
	b) A farm that uses organic and sustainable practices and sells their products locally	186	85,3	85,3	92,7
	c) A farm that uses non-local resources and sells their products to chain stores	16	7,3	7,3	100,0
	Total	218	100,0	100,0	

18. Table: Which of the following is an example of circular economy in a rural business?

Source: own research and compilation (2023), N=218

The next question asks what does C2C stand for. The correct answer is known by the 60.6% of the respondents which is Cradle to Cradle.

12. What does C2C stand for?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) Cradle to Circle	44	20,2	20,2	20,2
	b) Cradle to Cradle	132	60,6	60,6	80,7
	c) Circle to Cradle	42	19,3	19,3	100,0
	Total	218	100,0	100,0	

19. Table: What does C2C stand for?

Source: own research and compilation (2023), N=218

In the next question I asked the respondents to mark the examples of actions that can be taken to adjust to changes in climate, and the 76.1% of the respondents says it is recycling.

13. What are some examples of actions that can be taken to adjust to changes in climate?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) Recycling	166	76,1	76,1	76,1
	b) Raising homes off the ground	34	15,6	15,6	91,7
	c) Building a sea wall	18	8,3	8,3	100,0
	Total	218	100,0	100,0	

20. Table: What are some examples of actions that can be taken to adjust to changes in climate?

Source: own research and compilation (2023), N=218

The next question asks which of the listed concepts is not included in a circular economy. The 54.1% of the respondents know the right answer which is mining for raw materials – however, the percentage of the respondents were high at the other two answers which were wrong answers: the 22.9% of the answerers think that consuming products, and another 22.9% of them think that recycling waste products is not included in a circular economy.

14. Which of the following concepts is NOT included in a circular economy?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) Consuming products	50	22,9	22,9	22,9
	b) Recycling waste products	50	22,9	22,9	45,9
	c) Mining for raw materials	118	54,1	54,1	100,0
	Total	218	100,0	100,0	

21. Table: Which of the following concepts is NOT included in a circular economy?

Source: own research and compilation (2023), N=218

The last quiz question asks what types of equality would be excluded from the realm of social sustainability. According to the 46.8% of the respondents, it is precipitation levels, the 27.5% of them think that it is economic background and the 25.7% of them think that it is gender.

15. What types of equality would be excluded from the realm of social sustainability?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	a) economic background	60	27,5	27,5	27,5
	b) precipitation levels	102	46,8	46,8	74,3
	c) gender	56	25,7	25,7	100,0
	Total	218	100,0	100,0	

22. Table: What types of equality would be excluded from the realm of social sustainability?

Source: own research and compilation (2023), N=218

Based on the results of the quiz, I evaluated the knowledge of the respondents regarding sustainable tourism in general and in relation to North Hungary. I gave points to them based on their answers to 11 questions, so the maximum point which is available is 11, all correct answers are 1 point. The mean of the points is 7.6514, with standard deviation of 2.62696. The mode is 9 which is the point achieved by the most answerers.

Statistics

Points at questions

N	Valid	218
	Missing	0
Mean		7,6514
Median		8,0000
Mode		9,00
Std. Deviation		2,62696
Percentiles	25	5,0000
	50	8,0000
	75	10,0000

23. Table: Points at questions 1-11

Source: own research and compilation (2023), N=218

Below table presents the points in a detailed way. The 14.7% of the sample achieved the maximum at the quiz while the 20.2% of them got 9 points. Only the 0.9% of the sample gained 1 point and all of the respondents have at least 1 point.

Points at questions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1,00	2	,9	,9	,9
	2,00	8	3,7	3,7	4,6
	3,00	8	3,7	3,7	8,3
	4,00	10	4,6	4,6	12,8
	5,00	32	14,7	14,7	27,5
	6,00	6	2,8	2,8	30,3
	7,00	22	10,1	10,1	40,4
	8,00	26	11,9	11,9	52,3
	9,00	44	20,2	20,2	72,5
	10,00	28	12,8	12,8	85,3
	11,00	32	14,7	14,7	100,0
	Total	218	100,0	100,0	

24. Table: Detailed points at questions 1-10

Source: own research and compilation (2023), N=218

I categorized the people into three groups based on their points: who has 0-5 points has low level of sustainability knowledge level, people with 6-8 points have medium level of sustainability knowledge, and people with 9-11 points have high levels of sustainability knowledge.

Sustainability knowledge level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low level	60	27,5	27,5	27,5
	medium level	54	24,8	24,8	52,3
	high level	104	47,7	47,7	100,0
	Total	218	100,0	100,0	

25. Table: Sustainability knowledge level regarding Northern Hungary and rural tourism

Source: own research and compilation (2023), N=218

4.4. Open questions

The questionnaire also contained 15 open questions where I asked respondents about circular economy in general and in relation to Northern Hungary tourism.

I asked in the first question what the term “circular economy” means to the respondents. However, some participants did not answer this question, many informative answers have been received. The most answerers refer to sustainability and recycling, and many of them mentioned eco-friendly, sustainability, conservation, value creation, less waste. Some of

them mentioned that they did not know its meaning, and a few people provided the exact definition.

In the second question I asked them if you have heard of circular tourism, and if so, they were requested to provide an example. The most answerers haven't heard of it yet or only a little. As examples, the other answerers mentioned the followings: a restaurant uses local products, agriculture farming, zero waste, working farm stay and using local transportation.

In the third question, the respondents have been asked what they think are the benefits of implementing circular practices in the tourism industry. As benefits, the most respondents mentioned economic growth, and they also listed preserving the environment, promote sustainability, economic profit, reducing pollution, environmental awareness, use of local resources, reducing waste.

They were also asked, that in their opinion, what are the challenges that the tourism industry faces when transitioning to a circular economy. I received various answers to this question, like trends, changing the mindset, investing a lot of money, financial support, infrastructure, public awareness, governmental regulations, connection with global tourism and short-term profit drivers.

I asked them to write how the government and businesses can collaborate to support circular tourism. Financial support was the most common answer to this question, but the respondents also mentioned integrating the rules, policy, investment, governmental incentives, tax preferences for tourism enterprises, more public awareness campaigns and strictly enforced politics.

I asked them if you have personally experienced circular practices in the tourism industry. However, the majority of the sample hasn't experienced any of these practices yet but some answerers provided a few examples: recycled and handmade products, an airbnb cabin in the woods made from local materials and promoting hiking in the area. One of the respondents has a really negative opinion: *"The most of the cases are based in a rural areas in the middle of nowhere, and my experience is quite bad, since most of the business rely on European or government funds, so they were working just on high season and living on those helps the rest of the year, with 0 improvement in the meantime."*

They were listed to provide their suggestions for the tourism industry to further promote circular practices. The suggestions of the respondents touch different areas: try to be cheaper,

have a real will to do so, share experiences between countries, more awareness and incentives for users, investments, more marketing and collaboration.

I asked them what role they think consumers play in promoting circular practices in the tourism industry. A few answerers mentioned that buying green and/or local products would be a good solution, and they also mentioned implementation, they create demand, they support circular practices, share their positive experiences and providing their money.

I was curious about that according to their opinion how technology can be leveraged to support the transition to a circular economy in tourism. By providing the simple tools was mentioned by the most answerers, and one of the participants also said with sufficient investment, a variety of technological solutions can be implemented with the help of renewable energy sources. According to another opinion, Technology can implement more advance processes in recycling and consumption of resources in efficient and clean ways, and even dealing with waste in less harmful effects to the environment.

I asked them whether there are any specific destinations or businesses that they believe are doing particularly well in terms of implementing circular practices, and if yes, I asked them to share their reason. Many answerers provided a specific destination, like rural tourism or some agrotourism enterprises but they did not mention why. In case of some protected areas, one of the respondents mentioned that the reason is that management is more aware and willing.

In the next question, the respondents were asked about the main goal of the circular economy in Northern Hungary. The respondents listed different objectives, like to make equal opportunities for the citizens, supporting local businesses and promoting sustainability, less trash, promoting sustainability, reducing pollution, developing tourism and making use of local resources.

I asked them how local businesses are encouraged to adopt sustainable practices. According to the answerers, local businesses are encouraged through incentives, punishments, regulations, governmental encouragement, financial support, proper policy making and awareness.

They have been asked how tourists can explore the region’s natural beauty and cultural heritage in a responsible and sustainable way. Many of the answerers think that green transport to start with, like walking and cycling would be a good solution. They also

mentioned that by not harming the environment or dumping waste and use local facilities in a responsible way, by hiring local labour, by using local tourist houses and by paying attention to nature protection.

I asked the respondents to write the benefits of adopting a circular economy approach for the region's residents and visitors. According to some of the participants, the most important benefits are preserving the resources and improving the local economy, being more responsible and self-satisfaction especially educated ones, less trash in forests, economic growth for local enterprises, visitors experience good and exciting destination and can share positive image with others.

In the last question, I asked them to give an example of a local business in North Hungary that successfully adopted sustainable practices. The majority of the respondents said that they did no have any information about local businesses in North Hungary. Only a few people answered to this question with a proper example, they said the followings: recycling plastic into pellets for making new plastic products, StopCsomagolás store in Eger, Ladybirt Farm Leisure Hotel, Sarud Huculudvar, maybe some vineries, and: Szatyor does very good work in connecting people with local food producers.

5. Discussion

Before presenting the results, the tourism of Northern Hungary will be introduced. This region includes three counties: Borsod-Abaúj-Zemplén, Heves and Nógrad. This is the fourth biggest region in Hungary, its area is 13,429 km2. Regarding its geographic and natural characteristics, this is one of the most diverse Hungarian regions.

The 12.7% of the Hungarian population live here, the number of the population is 1,280,000 which is a bit higher than the Hungarian average. The half of the population lives in towns in North Hungary. From touristic perspective, 574 towns out of 573 belong to the touristic region.

The region offers different touristic products and services for the tourists, and there are many places which are worth to visit, for example:

- three world heritage sites: Hollókő, stalactite cave of Aggtelek, the historical wine region in the foothills of Tokai-hegyaljai
- four wine regions: Mátrai, Bükkaljai, Egri, Tokaj-hegyaljai
- historical cities, built heritages (castles), religious and historical memorial sites
- medical and thermal spas
- thematic paths
- international and national events on a yearly basis.

The region focuses on tourism development, its aim to become a region with complex touristic attractions where tourism has an important role in the economy of the region. The main development directions are the following: health tourism, business and conference tourism, water tourism (Tisza), heritage tourism, ecological and rural tourism, and golf tourism. Except golf tourism, all other tourism types are present in the region for many decades. The rivers and the lakes of the region provides good possibilities for water tourism; however, infrastructure needs to be developed. At the second biggest Hungarian river, Tisza, various sports related, and other relaxing possibilities can be chosen. In relation the sustainable tourism, we have to mention fishing which is a popular activity at Tisza and at the other smaller rivers, and even at the smaller lakes. Bicycle tourism could be significant in the region as well. The characteristics of the region are also favourable from the perspective of heritage tourism (Touristic Development Strategy of North Hungarian Region, 2006).

Based on the hypotheses, we can see, that the majority of the answerers see the positive effects of sustainability. Approximately the three-fourth of the respondents agree to H1 which says that the circular economy in rural areas can positively promote efficiency and sustainability in the region. This ratio is even a little higher in case of the H2: almost the four-fifth of them think that best practices implemented in rural areas can also modify the spatial structure of urban areas in a positive way. In case of H3, the ratio is a bit lower but almost the three-fourth of them think that the most effective policy instruments and their implementation methods should be identified and prioritized. The ratio is almost the same in case of H4 which says that lessons and recommendations can be formulated in terms of modern rural development and regional sustainability. In case of H5, approximately the 70% of the answerers think that rural development can be more sustainable if circular principles are implemented. Based on the results of the quantitative research, all five hypotheses are accepted. Based on the academic literature, it is important to provide information to all shareholders, including tourists regarding sustainability because if they are aware of the advantages of sustainability, they will be able to support the related initiatives. According to the results of the quantitative research, the majority of the respondents are aware of these positive effects in general.

6. Conclusions, recommendations

While offering insights into the evolving landscape of circular economy principles in the tourism sector, this study acknowledges its limitations. This exclusion may have overlooked valuable insights from industry reports and government publications. Methodologically, the bibliometric analysis, though informative, provides a quantitative assessment, potentially missing qualitative nuances. Future research could address these limitations by incorporating non-academic sources and conducting longitudinal analyses to trace the evolution of circular economy principles in tourism over an extended period. Exploring regional and cultural variations in how these principles are integrated into tourism practices could also be a fruitful avenue for further investigation, providing insights into unique challenges and opportunities across different global contexts. Future research directions may also consider the temporal aspect by conducting longitudinal analyses to trace the evolution of the relationship between circular economy principles and tourism over a more extended period. This can provide a better perspective on the trends and changes that might be occurring in the academic discourse. Lastly, considering the regional and cultural diversities in how circular economy principles are integrated into tourism practices. The Role of the Circular Economy in Shifting Tourism/Sustainable Tourism Toward Regenerative Tourism regional variations in this regard, shedding light on the unique challenges and opportunities specific to different global contexts. (Moaaz Kabil, Al Fauzi Rahmat, Mihály Hegedüs, Bernadett Galovics, Lóránt Dénes Dávid, 2024)

The knowledge of the answerers regarding sustainable tourism in North Hungary has been investigated through a quiz. Based on the quiz results, the two-third of the respondents know that the primary objective of the circular economy initiative in North Hungary is to promote sustainable practices and reduce waste. However, this ratio can be consered quite high but almost the one-quarter of them think that the primary objective is to prioritize economic growth over environmental responsibility which proves that many answerers have incorrect thoughts and information regarding sustainability, that is why Northern Hungary has to pay attention to provide information their objectives and their results in order to increase the awareness of the answerers. The importance of proper information is also proved by the answers regarding sustainable practices as the almost the one-fifth of the respondents think that businesses are encouraged to adopt sustainable practices through punishment and fines for not being eco-friendly. It would be important to change the mind of the answerers

regarding this question because all related encouragements are done on a positive way. The highest level of awareness refers to the opportunities of tourists to explore Northern Hungary's natural beauty and cultural heritage: almost the 90% of the respondents know that supporting local business is the best way to support them on sustainable and responsible ways. Based on these results, the answerers know the most regarding individual opportunities, but their knowledge and awareness should be deepened in relation to sustainable tourism in Northern Hungarian and even the relationship between businesses and sustainability. The respondents realized the importance of increasing awareness level, as many answerers mentioned that governments could support circular tourism if they increase public awareness which is important even based on the academic literature.

In relation to sustainable tourism in Northern Hungary, the awareness of the respondents is not really high. The primary objective of this touristic region is known by the majority of the respondents, however, when I asked them to describe it with their own words, they mentioned different goals, like promoting sustainability, reducing pollution, developing tourism and making use of local resources. It also proves the importance of increasing public awareness. It can be done through interactive programs, presenting good practices, supporting the involvement of the local people and even the tourists into these programs. The results of the questionnaire also proved that the initiatives are not known by the respondents, they were not able to name any example a local business in North Hungary that has successfully adopted sustainable practices – and that is why it is important to increase public awareness among Hungarian and even among foreign people.

7. Summary

The goal of my project was for the individuals in different countries to learn about Circular Economy and Circular Tourism that will effectively and successfully disseminate the future results widely, and contribute to increase the visibility of the new perspectives that I have find extremely important during my researches. In addition, I aimed to investigate the opportunities of sustainable tourism in general and even in relation to North Hungary. Another objective of my project was to provide recommendations for North Hungary to support and develop sustainable tourism.

In order to reach the objective of the research, I applied both secondary and primary research. At the beginning of the thesis, I created the theoretical review based on academic books and journals. I covered different topics there: Circular Economy concept, principles, development, adoption theory, strategies and business models. Moreover, the relationship between Circular Economy and Tourism have been introduced in a detailed way.

As primary research, I applied quantitative research. I investigated the awareness and the knowledge of the people regarding sustainability, sustainable tourism in general and in relation to North Hungary. The questionnaire targeted all people to get a general overview about their awareness. The sample size was 118. I examined five hypotheses, all of them have been accepted based on the results of the primary research. I had the following hypotheses: H1: The circular economy in rural areas can positively promote efficiency and sustainability in the region. H2: Best practices implemented in rural areas can also modify the spatial structure of urban areas in a positive way. H3: The most effective policy instruments and their implementation methods should be identified and prioritized. H4: Lessons and recommendations can be formulated in terms of modern rural development and regional sustainability. H5: Rural development can be more sustainable if circular principles are implemented.

As future research possibilities, a segmentation would be useful to investigate the knowledge and the awareness of the respondents based on their demographics. Qualitative research would also be useful, the initiatives and practices of North Hungarian sustainable tourism could be investigated further through a questionnaire.

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ANNEX 1

Hypothesis:

1. **The circular economy in rural areas can positively promote efficiency and sustainability in the region.**

(The circular economic model has the potential to reveal the impact and activities in rural areas. By applying this model to rural development strategies, policymakers can better understand how these practices can positively modify rural areas and promote efficiency and sustainability in the broader region.)

2. **Best practices implemented in rural areas can also modify the spatial structure of urban areas in a positive way.**

(The implementation of best practices in rural areas can also serve to positively modify the spatial structure of urban areas. This is due to the fact that such practices can lead to greater efficiency and sustainability in the surrounding regions, which can in turn provide benefits to urban areas that rely on them for resources and services. By leveraging the strengths of both rural and urban areas, it is possible to create a more cohesive and functional system that benefits all stakeholders. Therefore, it is important for policymakers to consider the potential impact of rural development strategies on urban areas, and to take steps to ensure that they are aligned with broader regional goals and objectives.)

3. **The most effective policy instruments and their implementation methods should be identified and prioritized.**

(Identifying and prioritizing the most effective policy instruments and implementation methods is crucial in modifying urban spatial structure in a positive and sustainable way. By incorporating best practices and sustainable practices, it may be possible to achieve this goal and create a more environmentally-friendly and community-oriented urban area.)

4. **Lessons and recommendations can be formulated in terms of modern rural development and regional sustainability.**

(It can be reasonably posited that lessons and recommendations can be devised in regards to contemporary rural development and regional sustainability. By prioritizing sustainable practices and fostering the growth of rural areas, it is conceivable that a more equitable and ecologically sound future could be attained. Nevertheless, additional research and analysis

would be required to comprehensively evaluate this hypothesis and determine the optimal strategies for achieving these objectives.)

5. **Rural development can be more sustainable if circular principles are implemented.**

(Based on the context provided, it seems plausible to hypothesize that rural development can indeed be more sustainable if circular principles are implemented. Circular practices, such as recycling, reducing waste, and promoting local resource utilization, can help rural communities to become more self-sufficient and less reliant on external resources. This can lead to a more sustainable and resilient rural economy, which benefits both the local community and the broader tourism industry. However, further research would be needed to fully test and validate this hypothesis.)

QUESTIONNAIRE:

The circular economy is an economic system that aims to minimize waste and promote sustainability. Circular tourism, on the other hand, is a type of tourism that promotes sustainable and responsible travel practices. In North Hungary, there are several initiatives and programs that support circular tourism and the circular economy. For example, local businesses are encouraged to adopt sustainable practices and reduce waste, while tourists are encouraged to explore the region's natural beauty and cultural heritage in a responsible and sustainable way. By embracing the principles of the circular economy and circular tourism, North Hungary is creating a more sustainable and resilient future for its residents and visitors alike.

Describe with your own words:

1. What does the term "circular economy" mean to you?

2. Have you heard of circular tourism? If so, can you provide an example?

3. What do you think are the benefits of implementing circular practices in the tourism industry?

4. In your opinion, what are the challenges that the tourism industry faces when transitioning to a circular economy?

5. How can the government and businesses collaborate to support circular tourism?

6. Have you personally experienced circular practices in the tourism industry? If so, can you describe your experience?

7. What suggestions do you have for the tourism industry to further promote circular practices?

8. What role do you think consumers play in promoting circular practices in the tourism industry?

9. How can technology be leveraged to support the transition to a circular economy in tourism?

10. Are there any specific destinations or businesses that you believe are doing particularly well in terms of implementing circular practices? Why?

11. What is the main goal of the circular economy in North Hungary?

12. How are local businesses encouraged to adopt sustainable practices?

13. How can tourists explore the region's natural beauty and cultural heritage in a responsible and sustainable way?

14. What are the benefits of adopting a circular economy approach for the region's residents and visitors?

15. Can you give an example of a local business in North Hungary that has successfully adopted sustainable practices?

Thank you for taking the time to complete this questionnaire.
Your input is greatly appreciated.

ANNEX 2

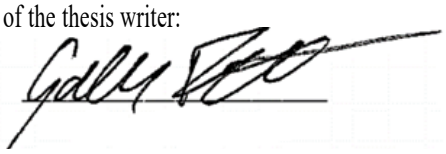
DECLARATION

I, the undersigned, Bernadett Erzsébet Galovics hereby declare under penalty of perjury that the thesis I submitted under the title CIRCULAR ECONOMY: INTEGRATING CIRCULAR ECONOMY PRINCIPLES ONTO TOURISM is entirely the result of my own work. When I used other authors' works, either printed or electronic, I accurately cited the sources.

I understand that the electronic copy of the diploma thesis will be placed in the library of the Hungarian University of Agriculture and Life Sciences after the defense where the readers of the library will have access to it.

Signed in Gyöngyös on 22. 04. 2024.

Signature of the thesis writer:



ANNEX 3

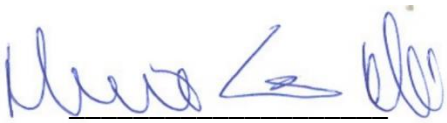
DECLARATION

I, as Galovics Bernadett Erzsébet's (FZY4S9) supervisor, declare that I have reviewed the thesis, informed the student about the requirements of proper handling of literary sources, and the legal and ethical rules.

I **recommend** the **thesis** for defense at the final exam.

Does the thesis contain state or official secrets: yes **no**

Signed in: Budapest on 22. 04. 2024.



Supervisor
Dr. Dávid Lóránt Dénes

ANNEX 4

DECLARATION

on authenticity and public assess of final thesis

Student's name:	Bernadett Erzsébet Galovics
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I declare that the submitted final thesis is my own, original individual creation. Any parts taken from an another author's work are clearly marked, and listed in the table of contents.

If the statements above are not true, I acknowledge that the Final examination board excludes me from participation in the final exam, and I am only allowed to take final exam if I submit another final thesis.

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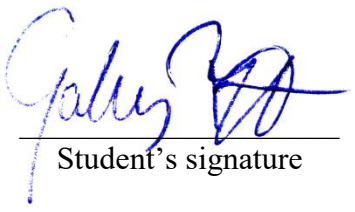

Student's signature