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CIRCULAR ECONOMY AND TOURISM SUSTAINABILITY: AN OVERVIEW

*Sciortino C and De Cantis S

Department of Economics, Business and Statistics, University of Palermo, Italy

Abstract: The last few decades have witnessed unprecedented tourism growth, accompanied by the unstoppable growth of adverse effects, including the excessive number of visitors in tourist destinations, which have caused them to exceed their carrying capacity. The saturation of tourist destinations has led governments to adopt measures as soon as possible to safeguard the environment through a sustainability-oriented approach. As one of the most profitable sectors for governments, the tourism industry must be at the forefront of the global sustainability challenge. In this context, the circular economy, with its approach geared towards a gradual move away from linear-traditional resource management, seems to lend itself well to this. Indeed, tourism is a product of the linear model; nevertheless, it can be integrated into circular systems. This work aims to present what is meant by the circular economy, highlighting its main aspects and presenting the most relevant circularity issues in tourism. The authors' primary purpose was to provide a review of the works conducted in the last years to clarify what has been discussed in the context of circular tourism. Consequently, a conceptual framework of the topics involved has been implemented to overview the circular economy and tourism-related issues. A particular focus on the business models of the circular economy, with a brief application to the tourism sector, is proposed. The results show the lack of contributions in the literature in terms of circular economy and circular tourism; finally, in the conclusions, the authors emphasize the importance of sustainability of tourism mobility.

Keywords: circularity, circular tourism, sustainable tourism, tourism mobility, overtourism

Introduction

The last few decades have seen unprecedented growth in tourism, but an unstoppable growth in negative impacts has also accompanied this. The unstoppable growth of tourism and related activities has prompted governments to emphasize tourism sustainability issues. Tourist destinations, significantly since the emergence of mass tourism, encouraged by cost-cutting that has intensified the frequency of travel, are saturated, overcrowded and degraded by tourist activities that damage residents' quality of life. The adverse effects of tourism often outweigh the positive ones: pollution, congestion, impoverishment of local destinations, incorrect and not long-term management of destinations by policy makers are just some of the adverse effects of tourism. The described situation has been defined with one word: "over-tourism".

From an economic point of view, in recent years, the linear-traditional approach to resource production, use, and consumption is trying to be replaced by a more sustainable path, which sees resources as not exhaustible in the short term but reusable and re-introducible in the production chain.

Corresponding Author's Email: *caterina.sciortino@unipa.it

The ever-increasing need to position ecological systems with economic systems in the same direction has led to the emergence of a new sustainable tourism model from a social, environmental and economical point of view. The circular economy paradigm has been considered by several authors as a possible solution to the issues related to the sustainability.

The circular system was created to keep the designed products in the system. When the product life cycle comes to an end, resources continue to be held in the system and are reused repeatedly. In the linear model, traditionally, the aim was to improve resource use efficiency without considering resources in the construction of a value chain. Therefore, the circular model is a kind of reparative economy of traditional linear systems. In the field of tourism, several measures have already been initiated from the point of view of sustainability. Circularity practices applied to the tourism sectors are only a recent issue that needs more investigation and application. The relationship between circular economy and tourism sustainability is at the heart of this paper, exploring the differences and similarities between the two concepts. If sustainability could be superimposed on circularity at first glance, this work highlights the relationship between them by observing how circularity practices are not necessary practices of sustainable tourism.

This paper has a twofold objective: to introduce the concept of the circular economy, noting the salient information and business models associated with and applicable to the tourism sector; secondly, to shed light on what has been discussed in the literature and what might still be discussed in the future. Thus, the scope of this paper is to highlight the scientific debate born in the last years around the issues related to the circularity and tourism, from one hand; from the other hand, to describe some case studies on the application of circular economy principles to the tourism and hospitality sectors.

The paper has been divided into two mainsections. First, a general literature overview is divided into three subsections: the circular economy in a general perspective, the relationship between circular economy and tourism sector and, finally, issues related to tourism mobility. Secondly, a specific section is on the application of circular models in the tourism and hospitality sector, highlighting the importance of this sector in economies around the world and how it is also highly damaging to the environment and land. Finally, conclusions, main limitations of the study, and future recommendations are also presented in the final part of the work.

A literature overview of the topic

Circular economy: an introduction

An essential contribution to the understanding of the circular economy concept is made by Kirchherr *et al*. (2019) with the framework of the "9Rs", namely: refuse, rethink, reduce, reuse, repair, recondition, regenerate, repurpose, recycle, and recover. The authors (Kirchherr *et al*., 2019) hypothesized and conceptualized 9 R-strategies with possible characteristics and combinations. The 9 R's are organized into three sections based on the reference target (Table 1).

Table 1: The 9R-strategies of the circular model

Aim	Strategy	Description
Manufacturing and using product more smartly	R0 Refuse	Make the product redundant by abandoning its function or offering the same function with a radically different product
	R1 Rethink	Make intensive use of a product (e.g. sharing)
Extended product life cycle	R2 Reduce	Increase efficiency in the production or use of products by reducing the use of natural resources or materials
	R3 Reuse	Reuse a discarded product that is still in good condition and fulfills its original function by a new consumer
	R4 Repair	Repair and maintain a malfunctioning product so that it can be used in its original function
	R5 Refurbish	Restore an old product and upgrade it
	R6 Remanufacture	Using discarded products or parts there of in a new product with the same function
	R7 Repurpose	Using discarded products or parts there of in a new product with a different function
Useful application of materials	R8 Recycle	Process the materials to get the same or lower quality from them
	R9 Recover	Recover energy by incinerating materials

Source: Adapted by the authors from Kirchherr et al., 2019

The framework then explains the shift from the linear model to the circular model. From the use of resources, we move to extend the product's life cycle by increasing the efficiency of the product itself using recycled materials.

There are four principles that the circular economy can provide:

1) Resource benefits: since the consumption of virgin resources can be reduced.

2) Environmental benefits: because by reducing waste, environmental impact is reduced.

3) Benefits for the economy: it is possible to derive from these schemes' lower costs for companies and new jobs are created thanks to these new mechanisms.

4) Benefits for society: all the above benefits communities and society in general.

To apply the circular economy principles and implement valuable strategies to achieve specific goals, companies use business models, which are models that suggest what to do and what not to do. In general, a business model means an instrument that the company uses and prepares to intend to realize a product: it is, therefore, an a priori description of the product that will be realized, with final recipients, employed resources. For example, the business model for a hotel is to provide accommodation through rooms. And again, the business model for a restaurant is to target a specific customer base using a price level appropriate to the chosen segment.

In the circular economy domain, there are five business models: circular supply chain, recovery, and recycling, product life extension, sharing platform, product as a service (Dallocchio, 2021). The circular approach, therefore, presupposes turning value chain inefficiencies into business value. The main inefficiencies are well summarized by Arponen *et al*. (2018):

I) Unsustainable materials that cannot be regenerated.

II) Underutilized capacities.

III) Premature product lives.

IV) Wasted end-of-life.

V) Unexploited customer engagement.

According to Hieminga (2015) and Arponen *et al*. (2018), it is possible to transform these inefficiencies into business value through the circular economy business models described above. Considering the circular supply chain model, companies break away from what used to be the linear supply chain, reducing the production generated by energy born exclusively from fossil fuels. It means that with the linear supply chain, they used exclusively materials that created energy issues. On the other hand, through circular supply chains, companies can buy energy and materials or raw materials from other companies in the supply chain. Therefore, what comes from renewable sources will then be secondary materials that are readily biodegradable. In this way, no resources are lost because all the elements used are renewable, recyclable, and biodegradable (Gusmerotti *et al*., 2020).

From an economic point of view, the circular supply chain allows companies to amortize costs that could not be eliminated with the linear supply chain. For example, reducing production prices makes it possible to grant a lower selling price to the consumer. This increase in surplus makes it possible to obtain a more significant social benefit than production carried out in the linear supply chain.

The recovery and recycling model assumes that companies must implement strategies to ensure that production outputs and products that are usually discarded are instead fed into the process to pursue the life cycle. This model creates a recovery chain that operates through two supply chains:

1) Recycling: through which materials are recovered from waste and reused.

2) Upcycling (creative recycling): create objects from discarded materials to create new objects.

Therefore, a two-way product movement activity is required. Once the company has sold the products to customers, it must take the products back with it to start a new cycle in which the material is reborn (Gusmerotti *et al*., 2020).

The main advantages of this business model are six:

1) Reduced waste management costs

2) Increased revenues from the sale of unwanted products

3) Reduced environmental impact

4) Lower material costs

5) Ease of disposal of products by consumers

6) Greater interaction between company and customer.

So, the main difference between the two models described (circular supply chain and recovery and reuse) is that the latter acts at the end of the product's life. In contrast, the supply chain acts on the products to become biodegradable (Gusmerotti *et al*., 2020).

The third model to consider is called product life extension. This model is the answer to the unconditional use of resources because it attempts to extend the life of products as much as possible. However, in the beginning, the products must be made so that they can be easily upgraded, modified, and repaired.

The model of sharing platforms already existed in business but, in the circular economy, takes on different connotations (Dallocchio, 2021). It was born in the context of the sharing economy through networked sharing platforms that connect product owners with potential customers or organizations that intend to use the products (Gusmerotti *et al*., 2020).

The last model, called product as service, assumes as a critical principle that the consumer can give up owning a good and buys no longer a good but access to the good or its services. Unlike the previous model, however, the ownership of the good is maintained by the first owner since the good is not sold (Dallocchio, 2021). There are different types of products provided as a service:

1) Pay for use: for example, the printing service.

2) Rent/Hire: you buy the product as a service for a certain amount of time.

3) Performance-based agreement: in this case, the client buys the service, and the firm must guarantee a certain level of quality.

To assess and monitor progress and the challenges of the circular economy, the European Commission uses a set of indicators divided into four categories: Production and consumption, Waste management, Secondary raw materials, Competitiveness, and innovation (Table 2).

Table 2: Set of indicators to monitor the circular economy

1. Production and consumption: this area comprises four subsections which are: 1.1 Self-sufficiency of raw materials for production in the EU, 1.2 Green public procurement (as an indicator for financing aspects), 1.3 Waste production (as an indicator for consumption aspects), 1.4 Food waste.
2. Waste management: this area comprises two subsections which are:

2.1 Recycling rates (the share of waste that is recycled). 2.2 Specific waste streams (packaging waste, biowaste, e-waste, etc.).
3. Secondary raw materials: two indicators in this area: 3.1 Contribution of recycled materials to raw materials demand. 3.2 Trade of recyclable raw materials between the EU Member States and the rest of the world.
4. Competitiveness and innovation: two subsections in this area, which are: 4.1 Private investments, jobs, and gross value added, 4.2 Patents related to recycling and secondary raw materials as a proxy for innovation.

Source: adapted by the authors from https://ec.europa.eu/eurostat/web/circular-economy

Circular economy and tourism sector: a challenging relationship

Tourism as an economic activity is a product of the linear model and can be integrated into circular systems. Many authors have drawn attention to the dichotomy between the tourism industry's economic benefit and environmental damage (Girard and Nocca, 2017; Jones and Wynn, 2019; Martìnez-Cabrera and Francisco Lòpez-del-Pino, 2021).

Specifically, as Girard and Nocca (2017) described, tourism is the third-largest economic activity in the European Union. It brings a substantial amount of GDP to countries on the one hand and several negative impacts from a more ecological perspective on the other. The positive economic effects are lower than the negative ones in social, environmental, and cultural terms (Jones and Wynn, 2019). As explained by Martìnez-Cabrera and Francisco Lòpez-del-Pino (2021), the tourism industry is being for a mobility system because it is an important economic sector and for its negative environmental impact. Over the years, tourism management has proposed different strategies. The authors (Girard and Nocca, 2017) also proposed a model that can reduce costs and increase benefits in the tourism system.

Tourism is impactful to countries from two perspectives:

I. Positive: local economies and businesses benefit from tourism because it develops infrastructure, creates jobs, and drives the overall economy forward.

II. Negative: environmental damage and pollution, over-tourism in general, and overcrowding exceeding the carrying capacity.

Therefore, the circular economy and circular tourism go hand in hand with sustainable tourism practices and theories. The World Tourism Organization (UNWTO, 2020) defines sustainable tourism as: "Tourism that meets the needs of today's tourists and host regions while anticipating and enhancing opportunities for the future. All resources should be so managed that economic, social, and aesthetic needs can be met while maintaining the cultural integrity, essential ecological processes,

biological diversity, and life systems of the area in question. Sustainable tourism products are those that act in harmony with the local environment, community, and cultures so that they are the beneficiaries and not the victims of tourism development." (UNWTO, 2020).

As confirmed by authors Sorin and Sivarajah (2021), the existing literature on sustainable tourism is differentiated and quite substantial, unlike the literature on the circular economy, which instead sees limited academic contributions to tourism applications (Sorin and Sivarajah, 2021).

Vargas-Sànchez (2018) explains how a simple search using keywords such as "CE"(Circular Economy) and tourism; "tourism CE"; "circular tourism" using scientific databases, shows the scarcity of contributions in the literature. Following the author's review of the literature (Vargas-Sànchez, 2018), the first to talk about the circular economy in the tourism context was Fan (2008), treating the circular economy as the only solution to maintain sustainable tourism development in Henan, China.

A comprehensive work on the circular economy and tourism literature can be found in Rodriguez *et al*. (2020). As specified by the authors, studies that have exposed the transition of the tourism sector to the circular model are non-existent; instead, several publications (mainly by Chinese authors) have highlighted the strategies of tourism sustainability towards circular economy models. To solve the literature gap, the authors identified several streams to know the scientific production in terms of circular economy and tourism.

Following Manniche *et al*. (2017), it is possible to apply circular economy principles to the tourism sector. The authors (Manniche *et al*., pp. 75-100; 2017) identified three main categories of the tourism and hospitality sector: accommodation, restaurants/hotels, and spa sector. As far as the accommodation sector is concerned, high-tech solutions that allow the construction of buildings with new eco-friendly standards are the most popular situations. Again, "paperless hotels" are another example of integrated control systems to reduce environmental impact and not burden climate change (Manniche *et al*., p.80; 2017).

Interesting work conducted by Sørensen and Bærenholdt (2020) found potential tourism practices inherent in circular economy models. Specifically, the authors (Sørensen and Bærenholdt, 2020) constructed a simple model of circular economy in tourism (Figure 1).

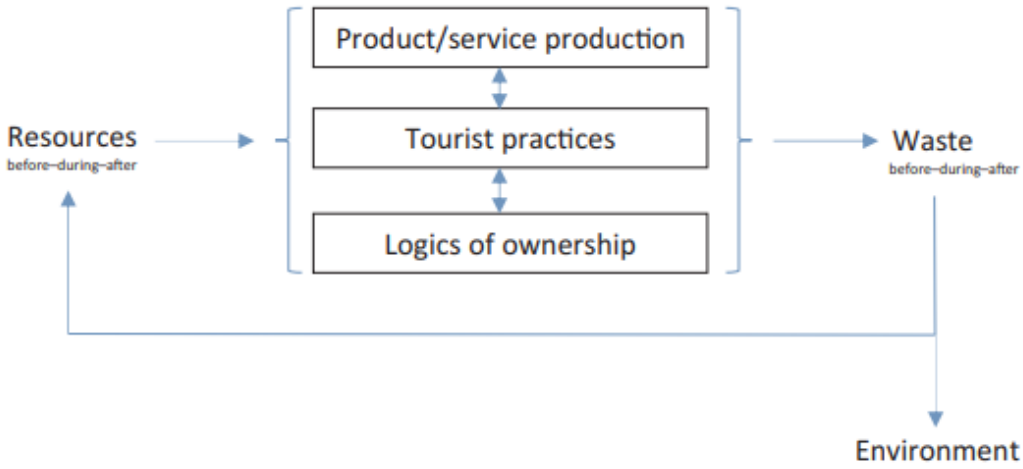

Figure 1: Simple model of circular economy in the tourism sector

Source: Sørensen and Bærenholdt (2020) in Tourist practices in the circular economy

The frame built by the authors (Sørensen and Bærenholdt, 2020) in figure 1 starts with a simple three-approach model: product/service activities (food and accommodation, for example), tourism practices (e.g., sharing economy with booking platforms like Airbnb, and finally logics of ownership).

As with other activities, the tourism industry has a value chain (direct travel value chain) that includes both directly and non-directly involved actors, activities and sectors, resources and markets, and tourism destinations. As defined by Einarsson and Sorin (2020), the circular economy could be an opportunity for travel and tourism stakeholders, particularly two key levels: for "heavy businesses" in terms of initiatives to optimize the use of resources and materials, and for "light businesses" delivering non-tangible services, such as travel agencies, they could activate bottom-up policies (Einarsson and Sorin, 2020).

Addressing the application of circular economy principles in the tourism industry, the work conducted by Jones and Wynn (2018) appears to be relevant in the context of the companies and business model principles applied. The work undertaken by the authors (Jones and Wynn, 2018) explores several companies and how they have used the principles described in terms of tourism sustainability and circular economy.

The European Union is beginning to talk about circular tourism in recent years. As indicated by Naydenov (2018), the term refers to mass tourism that intends to restore nature. Circular tourism follows the logic of the circular economy, with a series of business models that follow the logic of sustainability. In this sense, in circular tourism, there is the involvement of the different actors that are part of the tourism sector to follow an eco-friendly approach (Naydenov, 2018).

Several examples of circular tourism around Europe are implemented. For instance, in France, there is a certificate called "Ecogite" for the use of renewable energy (wood, sun, etc.) in the context of sustainable and authentic tourism ((Naydenov, 2018). And again, in Hungary, there are leisure farm hotels with the principle that waste equals Money. in fact, visitors can pay for their entrance with waste reusable. In other parts of Europe, the ecohotels are now depopulating with the intelligent and healthy use of resources while respecting the environment (Naydenov, 2018).

A focus on tourism mobility and circular economy

As the author (Volo, 2020) defines, the need to address issues related to overtourism has become a priority for academics and policymakers. The phenomenon of Overtourism brings adverse environmental, social, and cultural effects, degrades the most fragile destinations, and forces area residents to live in chaotic environments marked by crowding and the constant presence of issues related to tourism flows that exceed the carrying capacity of destinations. As for carrying capacity, this is the supply and demand viewpoint: excess demand that is not offset by available supply and goes beyond possible limits (Volo, 2020). The author (Volo, 2020) manages to summarize the issues and consequences of overtourism into three macro-categories: (1) lack of a systematic approach to the management of tourist destination flows; (2) disagreement on priorities by stakeholders; and (3) the development of new mobility paired to technological advances (Volo, 2020). Focusing on the last category, it is evident how tourism mobility has changed in the 21st century and has been accompanied by economic and, more specifically, technological terms. People are moving more, and tourism is now a mass phenomenon, easily accessible to most, thanks to low-cost airline flights and new forms of accommodation (e.g., shared accommodation).

Gowreesunkar (2020) proposes five indicatives but not exhaustive solutions to solve the problems and the negative consequences of Overtourism:

1) Diversification: mean offering little-known, remote, and virgin destinations to tourists in a way that streamlines and lightens the carrying capacity and exploitation in mass-market destinations

2) Ambidextrous management approach requires organizations to use both exploration and exploitation techniques to be successful (Gowreesunkar, 2020)

3) Destination Management Organizations' (DMOs) Roles: to mitigate the needs of tourists on the one hand, and residents on the other (Gowreesunkar, 2020)

4) Wise Use of Technology: smart technologies are the most effective solution to address the effects of overtourism (Gowreesunkar, 2020)

5) Creative tourism: the creation and re-creation of tourism products using existing and new resources is seen as a potential solution (Gowreesunkar, 2020)

For instance, in the case of smart technology, several international experiences show how the use of smart tools can help reduce overtourism. In Kyoto, they have used mobile phones with geolocation to assess which are the most congested hours of the day; in Barcelona, residents can report flats used for tourist use through an application. In addition, the use of virtual tours could encourage tourists to visit unfamiliar destinations.

Here, a further approach to the problem is proposed: the consideration of circular economy models and strategies to address the issue of overcrowding and excessive tourism mobility that has led destinations to exhaustion in terms of carrying capacity, resource utilization, excess demand, and scarcity of tourism supply.

According to Ram *et al*. (2013) it is necessary to reduce the frequency of travel and instead increase the average length of stay and to encourage proximity tourism, thus short-haul travel. The authors

(Ram *et al*., 2013) propose a new "three-gear model" to assess how happiness, motivation to travel, and distance perception pose resistance to unsustainable tourist behavior.

In the context of environmental sustainability and tourism, sustainable mobility was also born in the '90s. For example, when considering emissions, transportation, which is the most important driver of tourism mobility, is one of the most pollution-creating aspects within a destination (Le-Klähn, 2016). Many of the activities related to tourism affect ecological systems and increase pollution (Le-Klähn, 2016). Studies on sustainability emphasize that it is highly dependent on tourism mobility (Le-Klähn, 2016). In this sense, the phenomenon of overtourism is fully espoused on the issues of sustainability and carrying capacity because tourist destinations, mainly the most frequented and popular ones, are saturated and present severe problems related to environmental sustainability. The study conducted in Munich in 2016 by Le-Klähn, shows that it is necessary to incentivize, for example, the use of public transportation because it is potentially a strategy that policymakers should apply to improve sustainability policies. The strategy in this direction described by the author (Le-Klähn, 2016) is as follows: targeting the right visitors, offering the right pricing policies, improving the quality of services, providing the right and correct information regarding public transportation services to improve accessibility.

The main objective of sustainable tourist mobility is "to ensure that our transport systems meet society's economic, social and environmental needs whilst minimizing their undesirable impacts on the economy, society and the environment" (EC,1992). An assessment of sustainable mobility practices is determined to understand how many benefits this approach could obtain society:

1) Installation of an electric vehicle charging station.

2) Renting bicycles to guests.

3) Providing sustainable mobility to employees.

4) Promote public transport in tour packages.

It is possible to mention some of the most important examples of sustainable tourism mobility and circular economy by considering the business model of sharing platforms: carsharing, bike-sharing in terms of transportation and traffic management, Airbnb, and Booking (to a lesser extent) in terms of accommodation. In recent years, the interest in shared mobility has constantly been growing, mainly thanks to services such as bike-sharing and carsharing that have allowed a new perspective of environmental, economic, and urban policies (Wielinsk *et al*., 2017). The model of sharing platforms fits in perfectly because shared mobility is a service shared by a community in which several members and users benefit from the same service in the short term. Effectively, these shared mobility services can be considered as product-as-a-service business models because there is the temporary rental and use of a product as a service. Airbnb also fits well with both business models because this sharing platform allows hosts to share their accommodation in the short term to users who want to experience accommodation or move for work or other reasons for a limited period.

Therefore, it is necessary to integrate a circular mobility system in the above context. As Ellen Macarthur Foundation (2015) defined, a circular system could enable systems to favor high performance at low costs, because congestion would be reduced, cities would be environmentally impoverished, and, finally, unnecessary economic losses would be avoided., Thus, it is necessary to

convert excess road infrastructure with other types of infrastructure that can benefit citizens, such as green spaces, to make such a transition (Ellen Macarthur Foundation, 2016). A mobility system defined as circular must fulfill three main characteristics:

1) System accessibility and effectiveness.

2) Multimodal transport possibilities.

3) Electric, shared, and automated transport.

The features of the tourism sector in the circular economy scenario

Problems related to overtourism, mobility, crowding, to the main issues in tourism generally, are closely related to sustainability. In any case, the literature explains how the terms circularity and sustainability are not interchangeable. Circularity makes the world more sustainable; however, sustainability does not make the world more circular. The circular economy is based on resource cycles, whereas sustainability is more related to people, the planet, and the economy. Geissdoerfer *et al*. (2017) defines circularity as a regenerative system in which resources are minimized, while sustainability is the compressed between economic performance, social inclusiveness, and environmental resilience.

Taking the work conducted by Simon (2020) as a starting point, it is possible to define the significant differences between sustainability and circularity at a conceptual level (Table 3).

Table 3: The significant differences between sustainability and circularity

Issue	Sustainability	Circularity
Technosphere vs. Biosphere	From the field of ecology and environmental issues, focus on biosphere	Focus on technosphere, i.e., a human construct to have a conversion of raw materials for human consumption
Agency	Is diffused as a priority	Has a clear emphasis on governments and companies
Responsibility	Is shared but not defined	Is defined for private business, regulators and policymakers.

Source: adapted by the authors from Simon (2020)

Circularity practices applied to the tourism sector, particularly in the transport sector, should be a prerogative of many, but especially of airlines: as defined by Palmitessa (2017): Tourism results in the temporary transfer of people, being temporary it should have a less than the substantial impact on emissions. Instead, tourists' destinations are often far away, and such distances necessarily require planes, cruise ships, or cars. It means that even before arriving at the destination, the amount of CO2 emitted is already substantial (on average, transport is responsible for 75% of the CO2 emissions of the entire tourism sector) (Palmitessa, 2019). Palmitessa (2019), in his article, explains what general advice can be given to support the circular economy even on holiday:

1) Choose local products and organic food, which are certainly less impactful on the environment.

2) Prefer green means of transport (eco-bike, electric car, train, etc.).

3) Recycle, reuse resources as much as possible, even during the trip and during the stay in the tourist resort.

However, as van der Sterren (2021) defined, tourism is not a sector; instead, it is an amalgam of industries (agriculture, metal industry, construction, transport, services) combined to create the tourism product. The tourism supply chain sees within it four subsectors which are: leisure/business activities, travel services, food and beverage services, and finally, accommodation services (van der Sterren, 2021). The intersection between these four subsectors provides the tourism product, an experiential good that arises from the composition of goods supplied by the four industries. For this reason, dealing with the circular economy in tourism is potentially a replication of the same methods already applied in the four industries. van der Sterren (2021) defines through a diagram the relevance of the circular economy in the tourism sector (Figure 2), and in doing so, highlights the critical points of circularity (energy and water use, waste, and climate change).

	Energy Use	Water use	Other Resource use	Waste	Climate change
Accommodation:					
• Buildings	++	++	0/+	+	++
• Operations	+++	+++	+++	+++	+++
Restaurants/bars:					
• Buildings	++	++	+	++	+
• Operations	+	+	++	+++	+++
Transport: local	+	0/+	+	**0/+**	++
Transport: Origin - Destination	+++	0/+	+	**0/+**	+++
Activities: Events/ Attractions/ Festivals	+	++	+++	+++	+
Services (tour operators, travel agencies, financial services, booking services)	0/+	0/+	0/+	**0/+**	**0/+**

0 = irrelevant
+++ = most relevant

Figure 2: The relevance of circular economy in the tourism sector

Source: van der Sterren (2021) in "Sustainable supply chains in travel and tourism: towards a circular approach".

The author (van der Sterren, 2021) confirms that there are no specific indicators for the circular economy in tourism. Instead, there are indicators of sustainable development that are quantitative-managerial. However, as mentioned in the previous pages, sustainability is not necessarily synonymous with circularity and vice versa. For this reason, there is a need for a tool, a toolkit, capable of capturing the salient aspects of circularity in tourism. "Embracing circularity implies robust measurement and monitoring of the sustainable development impacts of economic activities […]". (UNWTO-UNEP, 2019, p. 66).

Conclusions

The aim of this work was to explain how the circular economy had to do with tourism, and from here, the novel concept of "circular tourism" was explored. At the same time, overtourism and sustainable

mobility were also addressed, highlighting the main aspects of sustainability on these topics. However, the main objective of the work is to provide a toolkit for measuring the circular economy in tourism, a challenge that is undertaken here for the first time.

The first part of the paper offered an overview of the circular economy concept, discussing the 9R strategy to understand the transition from traditional-linear to circular models fully. However, due to the high number of the contributions only a small number of the main papers is considered in the literature overview of this work being a limitation of the study. It was pointed out that this shift has been made compulsory by the environmental issues that involve the whole world. The tourism industry was also discussed as the most profitable sector for economies worldwide. Following the description of the various business models involved in the circular economy, sustainable tourism and circularity strategies adapted to tourism, such as waste management within hotels, were discussed. Circular tourism, a new concept that sees very little application in the literature and policymakers' agendas, was also discussed.

Another part of the work was dedicated to mobility and overtourism, it was discussed how the concept of sustainability in the management of destinations and the use of tourist flows is of vital importance for the preservation of the environment. The difference and similarity between sustainability and circularity was also discussed.

In this historical moment, characterized by the problems related to the pandemic, dealing with sustainability and circularity is vital. It should be placed at the top of all political agendas in the world. The COVID-19 has decreed a slowdown in tourist flows, preventing mobility between and within destinations

Introducing circularity into tourism can bring undoubted advantages for the many stakeholders involved:

- The resident population and the environmental context of the destination. In this sense, activating circular production processes in the tourism sector could generate undoubted advantages for the environment and the resident population. It could further create a more favorable perception of tourism by residents. In addition, circular tourism could generate positive economies with a strong local impact and additional economic benefits for the resident population. Indeed, one of the significant criticisms concerning the economic impacts of tourism is that they often have little relevance to the local population, and tourism earnings often end up far from the region in which they are produced.

- The tourists themselves. The quality of their experience could be enhanced by using a more sustainable and environmentally friendly service.

- Economic operators and producers of goods and services who implement circularity principles in their production cycles.

In general, therefore, a destination in which the supply of circular tourist goods and services is increased could benefit from an improvement in its image (brand), with a competitive advantage and positive effects on the economic level.

However, at least in an initial phase, the implementation of a circular production cycle (compared to a more traditional/linear one) would increase the cost of production, leading to the loss of some simple benefits by both those offering the service and those using the service itself (tourists).

Examples of circularity practices to be introduced in the tourism system include, for example, in hospitality services, the inclusion of separate waste collection in a hotel room, or the absence of an automatic daily towel change service (which is only changed on request). And again, in the restaurant services, the inclusion of a menu introducing locally produced food is more respectful of regional characteristics and production seasonality.

Initially, these new practices are likely to cause operational difficulties and lead to real diseconomies. However, it is also possible that such services may produce competitive advantages that improve the tourist's experience per se, their awareness of the impact of their activity on the destination, and ultimately an economic return for the producer/supplier. It produces greater satisfaction on the tourist with the travel experience and, ultimately, an economic benefit for the destination. Furthermore, it can be assumed that the benefits are themselves conditioned by developing a culture of sustainability and increased awareness for a circular offer.

Therefore, spreading the culture of sustainability and circularity is perhaps a precondition for the real development of a sustainable and circular tourist economy; a culture that should become the heritage of producers, tourist consumers, and resident communities.

A greater diffusion and awareness of the advantages of a circular economy and the improvement of supply in the direction of sustainability and circularity could be the prerequisites for generating a virtuous circle in which the proposal for circular tourism is nourished (in turn) by an economic return and a competitive advantage. It would benefit both the individual operators in the host communities and the tourists themselves. These benefits could moderate and outweigh the higher costs and adverse effects of a circular tourism offer. Future research could introduce new circularity practices on tourism and holiday segments, such as the cruise industry, which is always at the center of political and economic debates due to the heavy pollution and congestion from overtourism caused by cruise passengers in local destinations. Furthermore, better management by tourism agencies in offering certain tourism products could be a springboard for the development of sustainable and circular tourism.

Declaration of Interest Statement

The authors declare that they have no conflicts of interest.

References

Arponen, J., Juvonen, L. & Vanne, P. (2018). Circular economy business models for the manufacturing industry. In Circular Economy Playbook for Finnish SMEs

Cirtoinno. (2018). Destination: A circular tourism economy. https://circulareconomy.europa.eu/platform/sites/default/files/cirtoinno-handbook_eng-rev.-4.pdf

Dallocchio, M., Gori, L., & Teti, E. (2021). I modelli di business dell'economia circolare.

Ellen MacArthur Foundation. (2015). Growth within: A circular economy vision for a competitive Europe. Available in

https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation-Growth-Within_July15.pdf

Ellen MacArthur Foundation. (2016) "Intelligent Assets: Unlocking the Circular Economy Potential". Available in https://www.weforum.org/reports/intelligent-assets-unlocking-the-circular-economy-potential

Ellen MacArthur Foundation. (2017). Cities in the circular economy: An initial exploration. Available in: https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Cities-in-the-CE_An-Initial-Exploration.pdf

Fan, Y. (2008). Research on the development of tourism circular economy in Henan province. In Proceedings of International Conference on Industry Cluster Development and Management (pp. 550-553).

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The Circular Economy–A new sustainability paradigm?. *Journal of cleaner production*, 143, 757-768.

Girard, L. F., & Nocca, F. (2017). From linear to circular tourism. Aestimum, 70.

Gowreesunkar, V. G., & Thanh, T. V. (2020). Between overtourism and under-tourism: Impacts, implications, and probable solutions. In Overtourism (pp. 45-68). Palgrave Macmillan, Cham.

Gusmerotti, N. M., Frey, M., & Iraldo, F. (2020). Management dell'economia circolare: Principi, drivers, modelli di business e misurazione. FrancoAngeli.

Hieminga, G. (2015). Rethinking finance in a circular economy. ING Economics Department, 1-56.

Jones, P., & Wynn, M. G. (2019). The circular economy, natural capital and resilience in tourism and hospitality. International Journal of Contemporary Hospitality Management.

Kirchherr, J., & Piscicelli, L. (2019). Towards an education for the circular economy (ECE): five teaching principles and a case study. *Resources, Conservation and Recycling*, 150, 104406.

Lacy, P., Rutqvist, J., & Lamonica, B. (2016). Circular economy: Dallo spreco al valore. EGEA spa.

Le-Klähn, D. T. (2016). Sustainable Tourist Mobility: Implications for Urban Destination Management. In Sustainable Mobility in Metropolitan Regions (pp. 55-63). Springer VS, Wiesbaden.

Manniche, J., Topsø Larsen, K., Brandt Broegaard, R., & Holland, E. (2017). Destination: A circular tourism economy: A handbook for transitioning toward a circular economy within the tourism and hospitality sectors in the South Baltic Region.

Martínez-Cabrera, J., & López-del-Pino, F. (2021). The 10 Most Crucial Circular Economy Challenge Patterns in Tourism and the Effects of COVID-19. *Sustainability*, 13(9), 4940

Naydenov, K. (2018). Circular tourism as a key for eco-innovations in circular economy based on sustainable development. Proceeding of the 18th International Multidisciplinary Scientific GeoConference SGEM, Albena, Bulgaria, 30, 18-132.

Nedyalkova, S. (2016). Applying circular economy principles to sustainable tourism development. In Proceedings of the PM4SD European Summer School-Abstract and Conference Proceedings, Akureyri, Iceland (pp. 5-9).

Pamfilie, R., Firoiu, D., Croitoru, A. G., & Ionescu, G. H. I. (2018). Circular economy–A new direction for the sustainability of the hotel industry in Romania. *Amfiteatru Economic*, 20(48), 388-404.

Pine, B. J., Gilmore, J. H. (1998). Welcome to the experience economy. Harvard Business review. https://hbr.org/1998/07/welcome-to-the-experience-economy

Ram, Y., Nawijn, J., & Peeters, P. M. (2013). Happiness and limits to sustainable tourism mobility: a new conceptual model. *Journal of Sustainable Tourism*, 21(7), 1017-1035.

Rodríguez-Antón, J. M., & Alonso-Almeida, M. D. M. (2019). The circular economy strategy in hospitality: A multicase approach. *Sustainability*, 11(20), 5665.

Rodríguez, C., Florido, C., & Jacob, M. (2020). Circular economy contributions to the tourism sector: A critical literature review. *Sustainability*, 12(11), 4338.

Simon, S. (2020). What's the difference between Circular Economy and Sustainability. Collective Green, 29.

Sørensen, F., & Bærenholdt, J. O. (2020). Tourist practices in the circular economy. Annals of Tourism Research, 85, 103027.

Sorin, F., & Sivarajah, U. (2021). Exploring Circular economy in the hospitality industry: empirical evidence from Scandinavian hotel operators. *Scandinavian Journal of Hospitality and Tourism*, 21(3), 265-285.

Turner, R. K., & Pearce, D. W. (1990). The ethical foundations of sustainable economic development. International Institute for Environment and Development.

van der Sterren, J. (2021). Sustainable supply chains in travel and tourism: towards a circular approach. In Handbook for Sustainable Tourism Practitioners. Edward Elgar Publishing.

Vargas-Sánchez, A. (2018). The unavoidable disruption of the circular economy in tourism. Worldwide Hospitality and Tourism Themes.

Volo, S. (2020). Overtourism: Definitions, Enablers, Impacts and Managerial Challenges. In Overtourism (pp. 11-26). Palgrave Macmillan, Cham.

Wielinski, G., Trépanier, M., & Morency, C. (2017). Carsharing versus bikesharing: Comparing mobility behaviors. Transportation Research Record, 2650(1), 112-122.