Hypothetical Scenarios on the Development Model of the Circular Economy in Touristic Destinations

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Abstract

The tourism industry is facing many challenges, including reducing the ecological impact of its activities. To adapt to it, some tourism destination stakeholders have undertaken actions that increase the resilience of the local tourism ecosystem by reducing resource consumption while satisfying the demand expressed by their customers to consume more sustainable tourism offers. This paper presents a study on the implementation of circular economy principles in tourism, focusing on two destinations in Valais, Switzerland: Crans-Montana and Pfyn-Finges. By examining sustainable practices and fostering collaboration between tourism and other industries, the research identifies best practices and hypothetical scenarios to enhance regional sustainability and resilience. The findings suggest that systemic approaches, emphasising resource efficiency and closed-loop production, can significantly benefit tourism ecosystems, promoting economic diversification, environmental sustainability, and cultural preservation. The study contributes to the ongoing discourse on integrating Circular Economy principles into tourism, offering insights and recommendations for policymakers and industry stakeholders to foster more sustainable and resilient tourism models. A benchmark of the best practices of Circular Economy at the international level allows us to highlight the main material flows exchanged between the tourism value chain and its related industries, providing a promising outlook for the future of the tourism industry.

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Introduction

Tourism is facing many challenges linked to external factors, including climate change, intense global competition, shifting demands of tourists, and, more recently, the worldwide sanitary crises such as COVID-19, which have exposed the vulnerability of the industry. However, these challenges also present opportunities for the tourism industry to evolve and improve. It has become essential for tourism destinations to become more sustainable and resilient. Despite concerted actions and efforts in this direction, the outcome can be maximised, and some links strengthened (Grèzes et al., 2023). For tourism destinations, it is especially difficult to achieve sustainability due to an inherent paradox: while tourism depends on unspoiled surroundings, rich culture, and a thriving social environment for its survival, it simultaneously leads to environmental and social degradation with its massive water and energy consumption, food waste production, CO2 emissions and problems of traffic congestion (Rodríguez Carlos et al., (2020)).

On the other hand, the tourism industry faces another challenge related to internal factors linked to its systemic nature. Tourism actors may, in some cases, have an insufficient collaboration between and within tourism destinations, as well as other industries. This leads to a weakening of the system, which has negative effects on the economy, society, and environment. According to academics, better organisation of material, energy, knowledge, and service flows of the tourism system and its related businesses can create a more resilient and sustainable regional ecosystem (Einarsson & Sorin, 2020). For example, the relationships between tourism and the timber industry in Valais, Switzerland, could be strengthened: Currently, timber locally produced is exported to other countries to be processed into more value-added products. In contrast, the tourism industry mostly relies on timber sourced from other regions. Furthermore, many restaurants and hotels source food from far away. Strengthening collaboration between the different industries has the potential to bring economic, social, and environmental benefits.

The numerous challenges tourism systems are facing require urgent solutions to make the related industries more sustainable, circular, and resilient. It is essential to find systemic solutions to address these issues, which have a systemic nature (ARE, 2022). In this paper, we present a step of our research project that aims to identify the best practices of sustainable and circular tourism ecosystems by analysing two case study destinations in Valais, Switzerland and to elicit "hypothetical scenarios" of the emergence of circular economy schemes. The scope of the study encompasses the tourism value chain and its connections with other industries, such as wine growing, agriculture, energy and waste management, or the textile industry, in a systemic approach. Our project aims to benefit tourism regions and local economies, including their stakeholders, and lead them to a better understanding of difficulties and paths of improved collaboration to create solutions that meet local needs and finally increase regional embeddedness. The ultimate objective of our study is to transform the regional tourism ecosystem into a powerful and resilient system greater than the sum of its components.

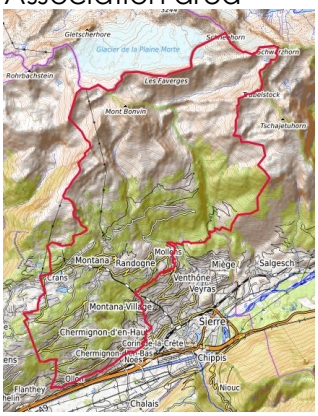
The application of systemic solutions to systemic challenges is gaining interest in science and politics in response to global social, environmental, and sanitary issues (Battistoni Chiara et al. (2019). In the scientific community, the transition from a linear perspective based on Cartesian and Newtonian models to a more holistic and ecological approach informed by discoveries in quantum physics has resulted in a paradigm shift and has had a significant impact on economists (Ibid.). Similarly, in the political arena, holistic and systemic perspectives have become increasingly important, as exemplified by the United Nations Agenda 2030 for sustainable

development. Tourism has the potential to contribute to all 17 Sustainable Development Goals (SDGs) approved by the UN in 2005, with relevance to Goals 8 (sustainable economic growth), 12 (sustainable consumption and production) and 14 (sustainable use of oceans and marine resources). These goals are meant to be achieved by 2030.

This study is embedded in a sustainable development approach. More concretely, it focuses on using the principles of the circular economy (Circular Economy). The main objective of our study is to identify possible improvements in two close tourism destinations, Crans-Montana and Pfyn-Finges, considering the circular economy theories.

The Finges Park comprises 12 municipalities with a total area of 279 square kilometres, situated between 500 and 4,153 metres above sea level (Figure 2). The association of communes of Crans-Montana (Figure 1) groups together 3 communes from the Finges Park to the Plaine-Morte glacier at an altitude of almost 3000 metres. The two sites are linked by geographical proximity but have strong topographical and biological differences due to the different altitudes and relief. People are also speaking two different languages: French in Crans-Montana and French and Swiss-German in the Finges area.

Figure 1
Crans-Montana Municipalities Association area



Source: Wikipedia

Figure 2
Finges' Park area

Source: Finges' Park website

This paper is organised as follows. After the introduction, the literature review section exposes the state of the art in the field of research and the theoretical framework. The methodology section presents the methods used for data collection and analysis. The results are detailed before the hypothetical scenarios are presented in the discussion section, followed by the concluding remarks.

Literature review

The concept of Circular Economy

The economic and ecological potential benefits of applying circular economy are significant. Ellen MacArthur Foundation found that transitioning to a circular economy could save up to $500 billion in resources every year (Ellen MacArthur Foundation, 2018) and reduce greenhouse gas emissions by up to 28%. Additionally, a study from the World Economic Forum found that transitioning to a circular economy could generate $4.5 trillion in economic activity by 2030 (World Economic Forum, 2020).

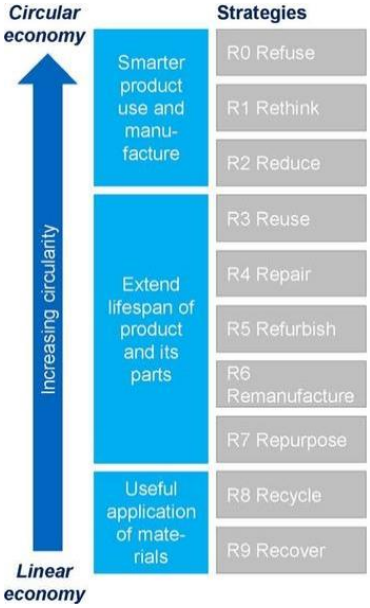
These studies illustrate the potential of a circular economy to create economic opportunities while reducing environmental impact.

According to Borrello et al. (2017), a Circular economy is an economic system in which resources and production processes are designed to be regenerative, generating new products and services while reducing or eliminating negative environmental impact. This is achieved by creating a circular flow of materials and energy in which resources are used as efficiently as possible. This effectively closes the loop between production, consumption, and waste management. In a circular economy, materials and energy are used efficiently, and the waste and by-products of a first industry are used as inputs for new production processes. This creates a system of closed-loop production and consumption in which resources are continuously recycled and reused, reducing the need for new virgin materials.

Because the theoretical foundations of the circular economy are still being consolidated and several theories co-exist (Economic Commission for Europe (2022, researchers selected three of them to conduct this study (1) (Kirchherr et al., 2017), (2) The Swiss Confederation Circular Economy systemic approach (Bafu, 2022), and (3) the 3 areas and 7 pillars of Circular Economy (Ademe, 2022). These three theories have been selected to cover a broad spectrum and range of circular economy activities. Moreover, they enable the analysis of the same practices from a different angle. In their way, each model makes it possible to specify and characterise good circular economy practices.

Kirchherr et al. (2017) characterise the operations that enable the transition from a purely linear economy to a circular economy (Figure 3). Although different models co-exist, this one includes the core principles (Table 1).

Figure 3
The 9R framework



Source: Kirchherr, Reike & Hekkert (2017)

Table 1
Description of the criteria

R0 refuse	Make the product redundant by abandoning its function or by offering the same function with a radically different product.
R1 Rethink	Make product use more intensive (e.g. by sharing product)

R2 Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials.
R3 Reuse	Reuse by another consumer of a discarded product which is still in good condition and fulfils its original function
R4 Repair	Repair and maintenance of defective product so it can be used with its original function
R5 Refurbish	Restore an old product and bring it up-to-date.
R6 Remanufacture	Use parts of discarded products in a new product with the same function.
R7 Repurpose	Use discarded product or its parts in a new product with a different function.
R8 Recycle	Process materials to obtain the same (high grade) or lower (low grade) quality
R9 Recover	**Incineration of material with energy recovery**

Source: Kirchherr, Reike & Hekkert, 2017

The government of France, as presented in Figure 4, uses a model for developing a circular economy on its territory that includes supply, demand, pure recycling, and waste management. This model includes seven pillars to improve resource efficiency (Ademe, 2022). Table 2 presents the description of these criteria.

Figure 4
The 3 areas and 7 pillars of circular economy

Source: Ademe (2022)

Table 2
Description of the criteria presented in figure 4

Sustainable supply	Extraction/exploitation and sustainable procurement
Eco-design	consider the whole life cycle of the product from its conception
Industrial and Territorial Ecology / industrial symbiosis	Exchange of flows or pooling of needs between companies
Product-Service System / functional economy	The consumer buys the use of a product and not the product itself.
Responsible Consumption	Responsible consumption, which should lead the buyer to make his choice taking into account the environmental impacts
Longer usage time	Repair, sale, second-hand donation, or second-hand purchase in the context of re-use or recycling
Recycling	Use raw materials from waste

Source: ADEME (2022)

The Swiss Confederation promotes the development of the circular economy with a systemic approach (ARE, 2022). This model allows one to analyse a product or service's cycles from the design and conception phase to its recycling by proposing good practices such as repair or sharing. Figure 5 presents the Swiss Confederation Circular Economy systemic approach, while Table 3 presents the description of the criteria applied.

Figure 5
The Swiss Confederation Circular Economy systemic approach

Source: BAFU (2022)

Table 3
Description of the criteria

Sharing	Several users benefit from a product and its degree of use increases.
Repairing	Extended product life
Renovating	Defective or used products are put back into function.
Reusing	A product (in working order) is given to another user.
Renewable resources in production	Renewable resources in production are used. Agriculture, forestry, and fish farming are used in such a way as to safeguard natural cycles and ecosystems.
Recycling	Disassembling products, sorting their components, and extracting toxic substances to obtain quality secondary raw materials and return them to the market

Source: Swiss Federal Office for Environment (BAFU, 2022)

Circular Economy in Tourism Research

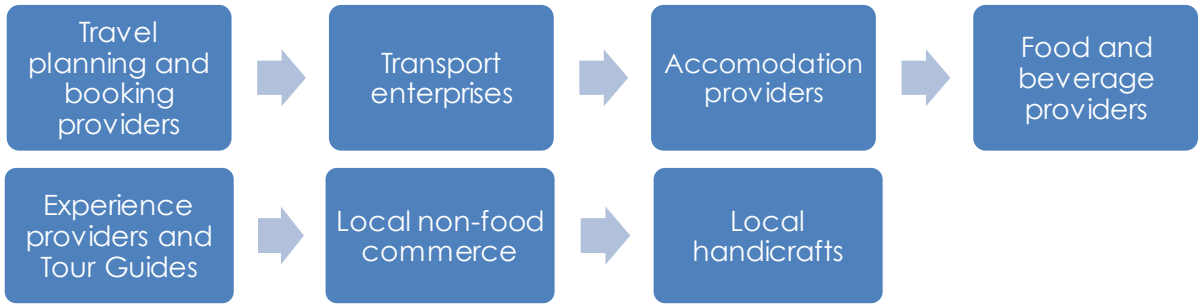
The principles of the circular economy can holistically benefit the tourism industry. Firstly, circular economy principles can help reduce waste, minimise the impact of tourism activities on the environment, and increase the efficiency of resources used by the industry. For instance, the reuse and recycling of materials can help reduce the use of new, virgin resources, as well as decrease the amount of waste generated by the industry. Secondly, circular economy principles can help the tourism industry

become more sustainable. By minimising the use of renewable energy sources like solar and wind energy, the industry can reduce its environmental footprint and become more ecologically friendly. Finally, circular economy principles can help the tourism industry become more competitive. By using energy and resource efficiency, the industry can reduce costs and gain a competitive edge. (Economic Commission for Europe, 2022; Einarsson S. and Sorin, F. ,2020; Rodríguez Carlos et alii, (2020). Our research includes different types of resources in terms of material and immaterial flows. These are of particular interest for tourism, including knowledge and skills. The aim is to make the most of the different resources available by sharing them.

Touristic value chain

Tourism is extremely fragmented in a territory, spread over several industries. As tourism is systemic by nature, researchers use a network approach to observe its functioning holistically. They used the following tourism value chain as a basis for addressing Circular Economy good practices (Figure 6).

Figure 6
Touristic value chain



Source: Author's elaboration based on Sorin & Einarsson (2020)

Methodology

Data collection

The data collection process is based on first-hand testimonies identified through the snowball method (Morgan, D., 2008) because of the hard-to-reach characteristic of the researched population among regional and national experts.

The qualitative interviews were conducted with 5 experts and practitioners, complemented with desk research. This allowed us to identify 33 cases of first-hand experiments on the field. To identify regional examples, we contacted Circular Economy experts (9 direct and 5 indirect contacts). This process allowed us to identify 26 examples and new sources.

Selection criteria were defined, such as Comparability and number of details in the data, Exclusion of examples of "green marketing, and Exclusion of examples of local procurement such as "short circuits" because short circuits are a distribution mode and not a design mode.

Data was collected through a case study analysis among the identified best practices, and second-hand data were collected in the form of a benchmark based on desk research integrating national databases of regional development projects (Regiosuisse) and international projects of the Circular Economy Research database. 111 best practices in the circular economy remained. According to the models of

circular economy presented above, we analysed the most frequently found criteria for these 111 examples to characterise the forms of circular economy encountered and their position in the tourism value chain. These best practices are distributed according to their classification on the touristic value chain used by the UNWTO (2013). We also noted the types of industries that are linked to the tourism industry. This process allows us to highlight the types of flows (financial, human resources, material, information) exchanged by actors within the tourism industry and with other interconnected industries. Finally, the large majority of the best practices identified are geographically located in Switzerland (48/111) and France (44/111). The remaining examples have either country-wide or even international scope (6/111).

Data analysis

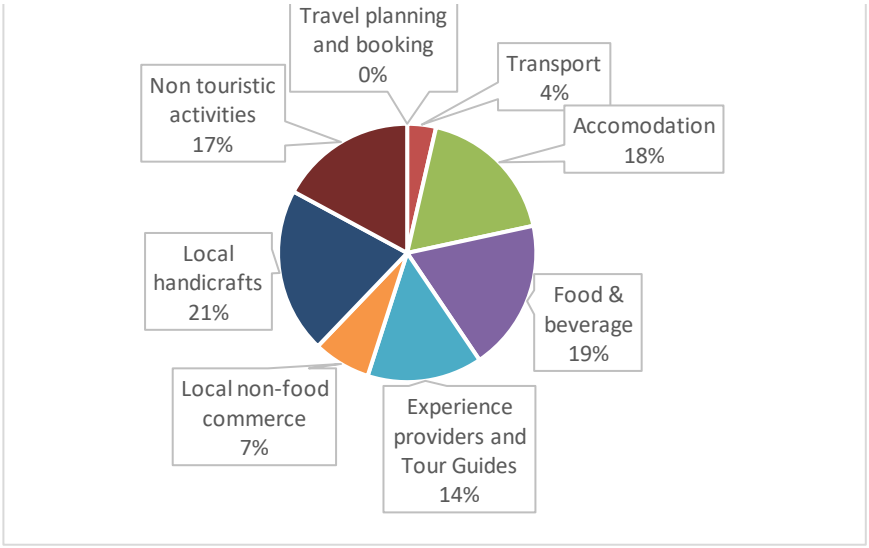
To illuminate what the data tell and what they do not, researchers conducted three blind analysis processes using the theoretical frameworks as a pattern analysis (Grèzes et al., 2023). Each circular economy practice has been analysed in light of these three theoretical models. Results are illustrated using descriptive statistics to illustrate the potential and degree of variety of circular economy activities linked to the tourism value chain.

Results

Distribution of the Circular Economy best practices among the tourism value chain

The distribution of Circular Economy best practices along the tourism value chain is, in decreasing order: local handicrafts (21%), food & beverage (19%), accommodation (18%), non-touristic activities (17%), experience providers and Tour Guides (14%), local non-food commerce (7%) and transport (4%).

Figure 7
Identified Circular Economy best practices on the tourism value chain (N=111)



Source: Author's illustration

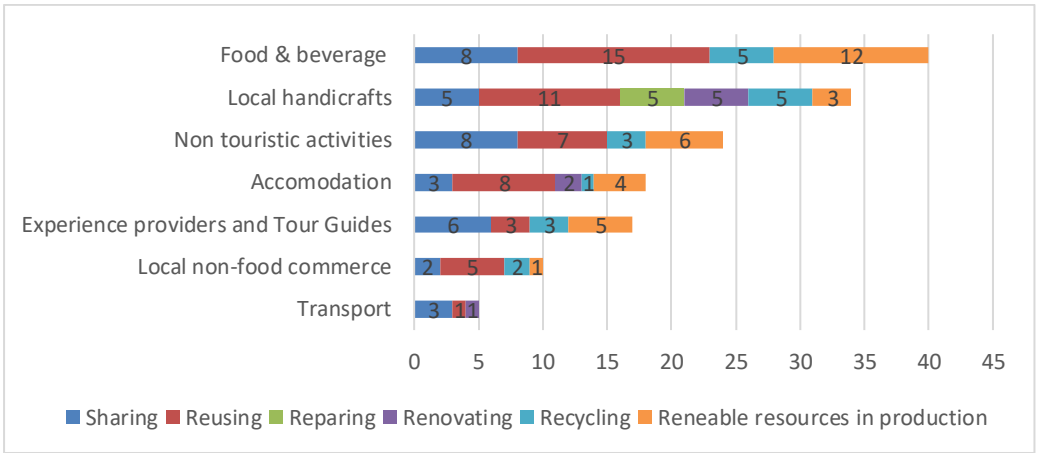
"Non-touristic activities" contain all examples outside the tourism value chain, such as online platforms for the exchange of information on the theme.

Types of Circular Economy Activities according to their Place in the Tourism Value Chain: 3 Theoretical models

Depending on whether one uses one or another theoretical model, the variables observed will highlight different stages along the tourism value chain. When using the following Swiss Confederation's model as a reference, the three most represented links are Food and beverage, local handicrafts, and non-touristic activities (Figure 8).

Figure 8

Types of Circular Economy activities (Admin.ch) according to their link in the value chain

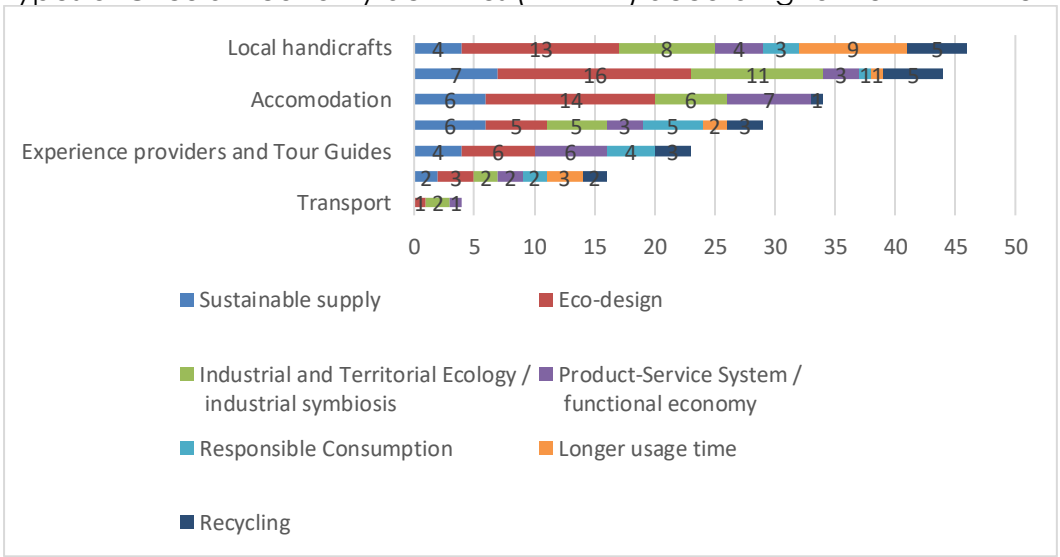


Source: Author's illustration

With this model, in the Food & beverage activities, the most represented variable is "reusing", such as a farm that produces sauerkraut from tea leaves previously used to make Kombucha (Figure 9). In comparison, the theoretical model used by the French government indicates that the three most represented links are Local handicrafts, Food and beverage and accommodation.

Figure 9

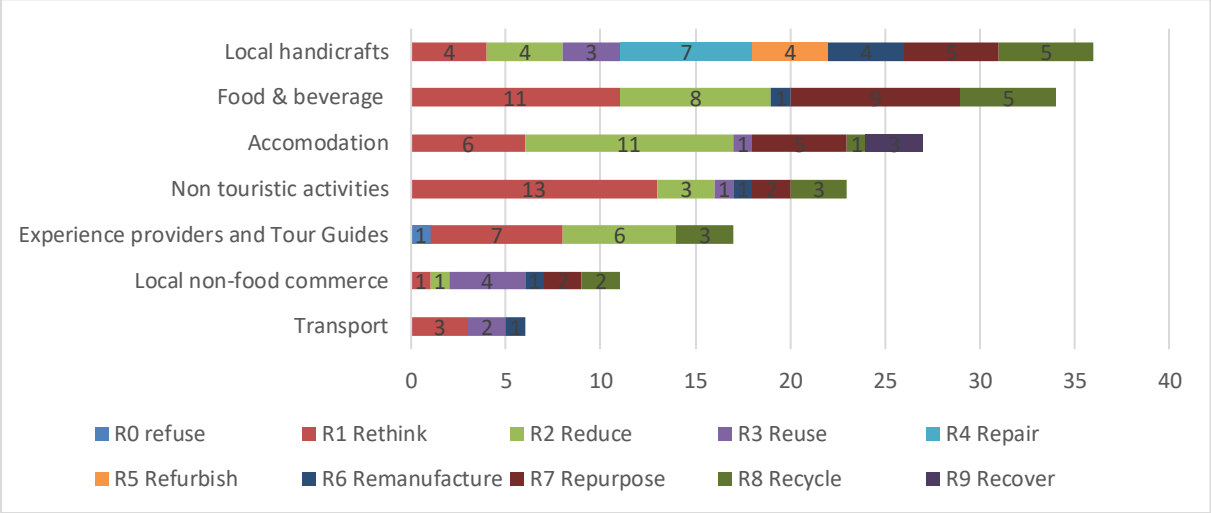
Types of Circular Economy activities (ADEME) according to their link in the value chain



Source: Author's illustration

With this model, the most represented variable is eco-design in the Food and beverage value chain link, such as the company Green Recycled Organics, which uses hotel and restaurant coffee grounds as an organic source for oyster mushroom production (Figure 10).

Figure 10
Types of Circular Economy activities according to their link in the value chain



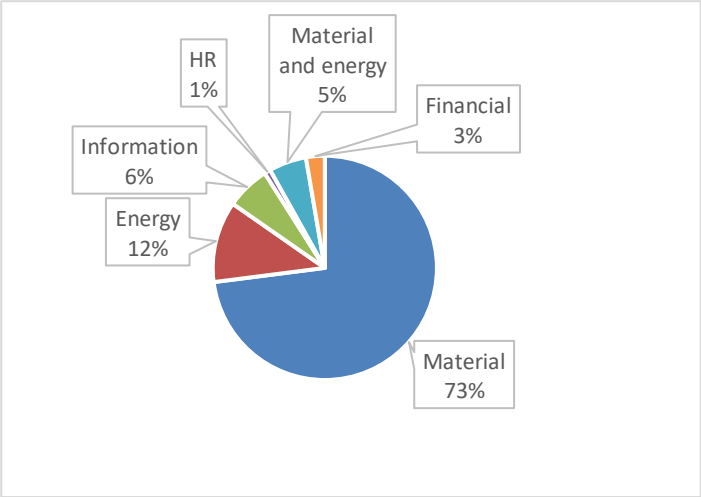
Source: Author's illustration, based on Kirchherr, Reike & Hekkert (2017)

Here, the most represented variable is "rethink" for activities outside the tourism value chain, i.e., "non-touristic activities," such as the Ricoter company in Aarberg, which recycles waste from the sugar and wood industries to replace peat for potting soil.

Exchange within and outside of the tourist value chain

The types of exchanges within and outside the tourism value chain consist mainly of material flows (73%). However, several different types were identified, such as Energy (12%), Information (6%), Material and energy (5%), Financial (3%) and HR (1%).

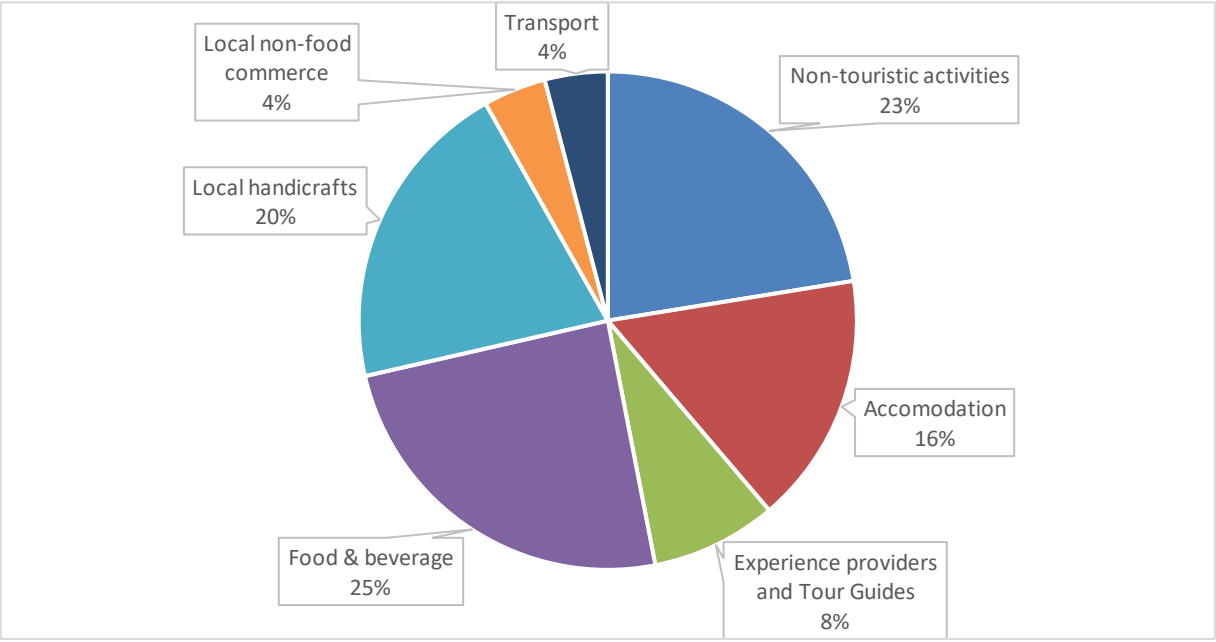
Figure 11
Types of flows involved (N=111)



Source: Author's illustration

As the Figure 11 shows, these types of flows (all types) have been identified in the following links of the value chain. Most of them concern non-touristic activities (23%) (meaning with industry outside of the touristic value chain), Food and beverage (25%) and accommodation (16%).

Figure 12
Distribution of resources flows on the touristic value chain (N=49)

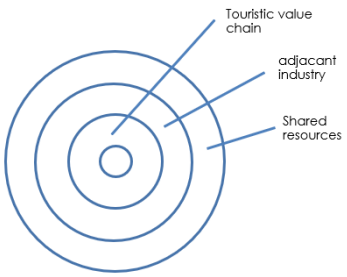


Source: Author's illustration

Figure 13 is a representation of the links in the value chain and their relationship to adjacent industries, defined as those with whom there is an exchange (all types of trade).

The size of each link corresponds to the proportion of the number of trades, as does the size of the adjacent industries. The outer circle represents the types of materials exchanged, as described in this scheme:

Figure 13



Source: Author's illustration

Figure 14
Resource shared between adjacent industries and their link to the tourism value chain (N=77)

Source: Author's illustration

Figure 14 highlights the links already existing between the various industries linked to the tourism value chain. To illustrate this, the 2nd Peak shop sells second-hand outdoor and mountaineering clothing to extend the product's lifespan, which highlights the link between the textile industry and the local non-food trade in the tourism value chain. This corresponds to the "longer usage time" according to the Ademe theoretical model, to the "reusing" according to the Swiss Confederation model and to the "reuse" according to Kirchherr, Reike & Hekkert (2017). In another example, vegan leather bags are created from leftover grape skins (shared resource), highlighting the links between local handicrafts and the growing wine industry. For classification purposes, this example corresponds to "eco-design" and "industrial symbiosis" according to

Ademe, "sharing" according to the Swiss Confederation model and "recover" and "rethink" using the Kirchherr, Reike & Hekkert (2017). Many intangible links were also noted, such as information sharing, with the example of the website changerdapproche.org, which offers 15,000 mountain routes accessible by public transport. Following the Ademe model, this corresponds to responsible consumption, the "sharing" of information according to the Swiss Confederation model and the "reducing" of the Kirchherr, Reike & Hekkert (2017). An example involving financial flows is the Wild Mountain destination in the United States, which returns $1 for every annual subscription sold to climate action organisations. This example is only represented and visible using the Ademe model, which corresponds to the variable "responsible consumption. This example is absent from the other theoretical models. In another example, the equipment needed for events (sound system, lighting, etc.) is mounted on a trailer and made accessible to a whole destination. For the Ademe model, this corresponds to "industrial symbiosis" and "responsible consumption", for the Admin model to "sharing" and "reuse", and for Kirchherr, Reike & Hekkert (2017) to "rethink". Finally, a local example noted the links between a cable car company and a mineral water company. Both have seasonal staffing needs, so they have pooled their needs to offer employees a single employment contract that runs throughout the year, enabling the sharing of qualified human resources. For Ademe, it is a question of "industrial symbiosis", for the Swiss confederation of "sharing" and for Kirchherr, Reike & Hekkert (2017) of "rethink" and "recover".

These links can be strengthened or developed at the scale of the study areas when these examples come from best practices observed in other regions.

Discussion

Based on previous observations, we elaborated hypothetical scenarios as the basis for the next steps of our research. We discussed them in a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) at the actors' and the region's scales.

Table 4 presents four hypothetical scenarios of circular economy application in tourism. In the first scenario, local craft shops use waste from tourism activities to create ecologically designed products. The second scenario directs accommodation providers to use local artisanal products in their design and services. The third scenario deals with cooperation between the food industry and industrial symbiosis to recycle resources and reduce waste. Finally, the fourth scenario involves sharing resources between tourism and non-tourism activities to optimise resource use and reduce the ecological footprint.

Table 4
Hypothetical scenarios of deployment of circular economy in tourism

Scenario	Description
Hypothetical Scenario 1: Local Handicrafts and Eco-Design	In this scenario, local handicrafts play a key role in transforming waste from various tourism activities such as leisure, accommodation and food into valuable eco-designed products. The artisans collaborate with tourism businesses to create unique and sustainable items that showcase the region's culture while minimising environmental impacts.
Hypothetical Scenario 2: Sustainable Accommodation	Accommodation providers in this scenario focus on eco-design principles to reduce waste and support local craftsmanship. They integrate locally made handicraft goods into their interior designs, amenities, and services. This approach not only enhances the guest experience but also contributes to the local economy and promotes sustainable tourism.

Hypothetical Scenario 3: Food & Beverage and Industrial Symbiosis	In this scenario, the food and beverage industries work closely with experienced providers to create an industrial symbiosis. They achieve this by reusing resources and adopting circular economy principles. This collaboration leads to unique gastronomic experiences that showcase the region's culinary traditions while minimising waste and promoting sustainable practices.
Hypothetical Scenario 4: Non-Touristic Activities and Resource Sharing	This scenario involves non-touristic activities collaborating with accommodation and experience providers to share and reuse resources. By adopting circular economy principles, these businesses optimise their use of resources, reduce waste, and minimise their environmental footprint. This cooperation fosters a sustainable tourism model that benefits all stakeholders, including tourists, businesses, and local communities.

Source: Authors' work

SWOT Analysis of the hypothetical scenarios

The SWOT Analysis is done for the region as the research tends to support the development of regional ecosystems.

Key Strengths

- Economic diversification: These scenarios promote the growth of local industries, such as handicrafts, food, and accommodations, by integrating them into the tourism experience.
- Environmental sustainability: By focusing on waste reduction, eco-design, and resource sharing, the scenarios contribute to a more sustainable tourism model.
- Cultural preservation: The integration of local traditions, craftsmanship, and culinary experiences helps preserve and promote the region's unique heritage.
- Enhanced visitor experiences: Tourists benefit from authentic, eco-friendly, and culturally rich experiences that connect them to the local community.

Key Weaknesses

- Coordination challenges: The collaboration of various actors across different sectors may face communication and logistical challenges, which could hinder the successful implementation of these scenarios.
- Initial investment: Implementing eco-design principles, resource-sharing initiatives, and other sustainable practices may require substantial upfront investment.
- Resistance to change: Some local businesses may be reluctant to adopt new practices, especially if they perceive them as costly or time-consuming.
- Limited local resources: There may be limitations to the availability or capacity of local artisans, food providers, and non-touristic services, affecting the potential for growth and collaboration.

Key Opportunities

- Market differentiation: By embracing circular economy principles, the region can attract environmentally conscious tourists and stand out from other destinations.
- Improved community relations: Collaboration between various sectors can foster a sense of community and lead to new partnerships.
- Capacity building: By working together, local businesses can enhance their skills and knowledge, benefiting from shared resources and experiences.

- Government support: The region's commitment to sustainable practices may attract attention and support from local or national governments.

Key Threats

- Economic instability: Factors such as global economic fluctuations, political instability, or natural disasters may affect the region's overall tourism industry, impacting the success of these scenarios.
- Competition: Other regions may adopt similar sustainable tourism models, leading to increased competition.
- Inadequate infrastructure: The region may lack the necessary infrastructure (e.g., transportation, waste management, or energy) to support sustainable tourism initiatives.
- Regulatory challenges: The implementation of circular economy practices may face regulatory obstacles or require changes to existing policies or laws.

The actors involved in these scenarios would have similar strengths, weaknesses, opportunities, and threats. They could benefit from enhanced collaboration, economic opportunities, and capacity building while facing challenges related to coordination, initial investment, and competition. Overall, the success of these scenarios would depend on effective collaboration, shared commitment to sustainability, and the ability to adapt to changes and seize opportunities.

Conclusion

This paper presented the regional best practices of ECs and their links between the tourism value chain and adjacent industries. The results show the potential of sharing resources of different types in the tourism ecosystem, creating benefits for different stakeholders.

Although most of the observed links are created by material exchanges, 27% of the links that contribute to the Circular Economy are of a different nature (HR, information, energy, etc.). This suggests that to understand this phenomenon, we need to also look widely at immaterial exchanges within and outside tourist destinations. This could take the form, for example, of pooling fixed-term contracts to create a permanent job between two industries or an online platform that lists resources that can be shared.

Although the three selected theoretical models of Circular Economy use different ways of observing practices, the four most represented links of the tourism value chain are similar; only the order is slightly modified. Regardless of the choice of model, the observed result is almost similar.

The main limitation of this study is the economic specialisation of the regions studied, which does not allow the conclusions to be extended to regions of a different nature. Furthermore, some good practices are at an emerging stage or under development, which implies that the examples identified are limited.

Nevertheless, this approach enabled us to design four hypothetical scenarios that can support regional actors in their search for Circular Economy paths. Moreover, it lays the basis for our next research step, which aims to reinforce the regional ecosystem and develop Circular Economy partnerships through the sensitisation and information of the actors based on regional workshops.

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