

Circular Economy in Tourism: Pathways to Equity and Innovation

Economía circular en turismo: caminos hacia la equidad y la innovación

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Abstract:

This article explores how the circular economy—when integrated with social justice and technological innovation—can reshape tourism into a more sustainable, socially just, and regenerative system. Through a critical review of academic literature and illustrative case studies, the document examines the tensions and potentials involved in transitioning from linear tourism models toward more systemic, community-centered approaches. Special attention is given to initiatives that leverage digital tools not only for resource optimization but also for promoting redistribution, inclusion, and territorial resilience. As an applied contribution, the article proposes the Circular Tourism Innovation Audit (CTIA), a diagnostic framework designed to assess tourism destinations across four dimensions: environmental performance, technological integration, social equity, and territorial coherence. The findings emphasize the need for place-based strategies, participatory governance, and ethical innovation to prevent circular tourism from replicating extractive or exclusionary practices. The article concludes by affirming that CTIA can guide fair and regenerative transitions and calls for participatory validation of the tool and its alignment with broader sustainability goals.

Keywords:

Circular economy, sustainable tourism, social justice, innovation, regenerative transitions, digital tools.

Resumen:

Este artículo analiza cómo la economía circular, al integrarse con la justicia social y la innovación tecnológica, puede transformar el turismo en un sistema más sostenible, justo y regenerativo. A partir de una revisión crítica de literatura académica y estudios de caso ilustrativos, se examinan las tensiones y posibilidades que surgen al transitar desde modelos turísticos lineales hacia enfoques sistémicos centrados en las comunidades. Se presta especial atención a iniciativas que emplean herramientas digitales no solo para optimizar recursos, sino también para promover la redistribución, la inclusión y la resiliencia territorial. Como contribución aplicada, se propone la Auditoría de Innovación en Turismo Circular (CTIA, por sus siglas en inglés), un marco diagnóstico diseñado para evaluar destinos turísticos en cuatro dimensiones: desempeño ambiental, integración tecnológica, equidad social y coherencia territorial. Los hallazgos destacan la necesidad de estrategias contextualizadas, gobernanza participativa e innovación ética para evitar que el turismo circular reproduzca lógicas extractivas o excluyentes. El artículo concluye que la CTIA puede orientar transiciones turísticas más justas y regenerativas, e invita a validar la herramienta de manera participativa y alinearla con metas más amplias de sostenibilidad.

Palabras Clave:

Economía circular, turismo sostenible, justicia social, innovación, transiciones regenerativas, herramientas digitales.

Introduction

The urgency to transition toward more sustainable, equitable, and resilient tourism models has intensified due

to climate change, deepening inequalities, and the degradation of ecosystems overexploited by conventional tourism. Although international frameworks have promoted sustainability-oriented agendas, many remain

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limited to technical approaches focused on efficiency and impact mitigation, often failing to challenge the extractive and asymmetrical logics of the dominant tourism paradigm.

Within this context, the circular economy has gained traction as a model aimed at redesigning systems of production and consumption through the closure of material loops, the regeneration of ecosystems, and the responsible use of resources. However, in tourism, CE is still applied in fragmented or technocratic ways, frequently reduced to environmental performance indicators or business efficiency strategies, with insufficient integration of ethical, social, or territorial dimensions.

Simultaneously, emerging technologies—such as artificial intelligence, blockchain, digital traceability systems, and collaborative platforms—are transforming tourism practices, opening new possibilities for decentralized management and enhanced transparency. Yet, their potential to contribute to a just and regenerative transition remains uneven and highly dependent on how they are designed, implemented, and governed. When detached from local contexts and power dynamics, these tools can exacerbate existing inequalities and reinforce centralized control.

This article aims to critically examine the intersection between the circular economy, social justice, and digital innovation within the tourism sector. It explores how these approaches can be articulated to support more inclusive, regenerative, and context-sensitive practices. Drawing on a literature review and comparative case analysis, the study identifies key tensions, opportunities, and guiding principles for reimagining tourism beyond linear, exclusionary, and growth-driven frameworks.

Rather than proposing a new prescriptive model, the article offers a strategic framework—the Circular Tourism Innovation Audit—to support destinations in assessing their circular performance across four interconnected dimensions: environmental, technological, social, and territorial. This diagnostic tool aims to guide policymakers, practitioners, and communities in co-creating tourism strategies that prioritize sustainability, equity, and resilience.

Finally, the article poses a guiding question for future research: To what extent can circular economy principles, when integrated with justice-oriented governance and ethical technologies, transform tourism into a force for territorial regeneration and social redistribution? This question invites both theoretical reflection and applied experimentation, opening pathways for new methodologies, indicators, and collaborative planning processes in tourism transitions.

1. Literature Review

1.1 Circular Economy in Tourism: Pathways to Equity and Innovation

The Circular Economy (CE) is a sustainable model aimed at efficient resource use, waste reduction, and extending product life cycles. In tourism, CE fosters sustainable resource management, service innovation, and supports local communities [1].

In contrast to the classical linear production and consumption model—focused on maximizing short-term profit—CE challenges the environmental unsustainability and resource depletion it has caused. Since the 1990s, several schools of thought have advocated for a paradigm shift towards sustainable and circular systems. However, there is still no unified scientific definition of CE or consensus on how to measure its implementation, particularly in tourism contexts [2].

According to the handbook *Destination: A Circular Tourism Economy*, CE represents a paradigmatic shift away from traditional linear models, which follow the extract-use-dispose logic [3]. CE seeks to close loops, regenerate ecosystems, and decouple tourism growth from environmental degradation.

1.1.2 Tourism and Social Justice: Critical Perspectives for Equitable Transitions

Several authors view CE as a valuable alternative to the linear paradigm, emphasizing strategies such as reuse, recycling, and repair. These approaches contribute not only to waste reduction and resource conservation but also stimulate innovation and generate new business opportunities in tourism—such as accommodations that reuse materials or services promoting collaborative consumption and environmental stewardship [1] [2] [3].

However, scholars also recognize important implementation challenges. These include resistance to change among businesses and tourists, as well as the absence of regulatory frameworks and supportive public policies. González-Sánchez et al. [4] highlight the fragmented nature of current research and its limited scope, which hinders a comprehensive understanding of how CE can be implemented across diverse tourism contexts.

According to these authors, transitioning to circular tourism requires coordinated action from multiple stakeholders—including businesses, tourists, residents, and public institutions—which demands high levels of collaboration and intersectoral governance. They also point to additional barriers such as the need to redesign existing organizational routines and services, the lack of adequate digital tools, and the scarcity of empirical studies, especially in the post-pandemic context. These gaps constrain the effective adoption and scaling of circular

strategies in tourism. Aligning tourism practices with the Sustainable Development Goals (SDGs) remains an unresolved challenge, requiring stronger policy frameworks and deeper scientific engagement [4].

1.1.3 From Circularity to Social Justice in Tourism

Although CE has traditionally focused on environmental sustainability, its integration with social justice is increasingly emphasized in tourism literature. Santos & Cuevas [5] explore this intersection through the lens of community-based tourism, analyzing cases from Mexico and Brazil where communities maintain control over tourism projects, reinforcing cultural identity and local knowledge. Their work highlights how tourism can function as a strategy for resistance, territorial defense, and intercultural exchange.

Moscardo & Murphy [6] propose a Quality of Life (QoL) framework that places communities at the center of tourism planning. Their approach evaluates development scenarios based on their impact on various forms of capital—natural, social, and cultural—and prioritizes sustainable, resilient options that enhance resident well-being.

Complementarily, the degrowth literature argues that scaling back tourism activities can yield environmental and social benefits. Dwyer [7], Fletcher et al. [8], and Sharpley [9] point to the risks of overtourism and advocate for structural changes, such as moratoria, eco-taxation, and capacity limits on transport and infrastructure. Degrowth is positioned not as a rejection of tourism, but as a reimaging of its purpose in favor of equity, ecological sustainability, and local resilience.

1.1.4 Technological Innovation as an Enabler of Circular Tourism

Emerging technologies play a crucial role in advancing CE principles in tourism. Gretzel [10] describes Smart Destination Management Organizations (DMOs) as digitally enabled, sensing institutions that monitor and manage tourism flows in real time, enabling adaptive governance and proactive sustainability strategies.

Startups also contribute to circular innovation by leveraging Industry 4.0 tools—including sensors, AI, and digital platforms—to reduce waste, optimize resource use, and personalize sustainable experiences [11]. However, Gelter & Malagón-Vélez [12] [13] caution that dominant narratives around "smart" tourism may obscure ethical risks, such as digital exclusion or lack of transparency.

Thus, aligning digital innovation with inclusive governance, transparency, and social participation is essential for ensuring that circular transformations in tourism do not exacerbate existing inequalities.

1.2 Tourism and Social Justice: Critical Perspectives for Equitable Transitions

1.2.1 Theoretical Foundations of Social Justice in Tourism

Higgins-Desbiolles [14] proposes socialising tourism as a strategy to reorient the sector toward social and ecological justice by placing community rights, benefits, and control at the centre of tourism planning. This approach advocates for inclusive governance, support for cooperatives and social enterprises, and the protection of public goods, opposing privatization and unregulated growth. However, as Bazrafshan [15] points out, systemic barriers—such as funding limitations, publication biases, and dominant research paradigms—often hinder justice-oriented scholarship, reinforcing conventional perspectives and excluding community-engaged approaches. In this context, community-based tourism (CBT) has emerged as a strategy that allows residents to regain control over their territories, reaffirm their cultural identity, and assert their rights. Santos & Cuevas [5] examine experiences in Mexico and Brazil that illustrate how local communities actively resist externally imposed tourism models and instead promote autonomous projects aligned with their worldviews and collective needs.

1.2.2 Tourism as Resistance and Cultural Affirmation

According to Santos & Cuevas [5], tourism in certain contexts becomes a vehicle for resistance, cultural affirmation, and territorial defense. Their research underscores the importance of co-creating knowledge between researchers and communities, recognizing tourism not merely as an economic activity but as a tool for asserting life projects rooted in collective memory and autonomy. These initiatives emphasize respectful intercultural exchange and the preservation of intangible heritage, often neglected in mainstream tourism development.

This form of tourism demands participatory methodologies and long-term processes, where communities define the pace, scale, and scope of tourism interventions. Such practices align closely with justice tourism frameworks that prioritize community well-being over profitability.

1.2.3 Quality of Life and Community-Centered Tourism Planning

The framework proposed by Moscardo & Murphy [6] centers the concept of QoL as a guiding principle for tourism planning. Their approach starts by identifying the needs and resources of local communities and evaluates potential tourism development scenarios in terms of their impacts on natural, social, and cultural capital. By doing so, their model ensures that tourism contributes net benefits to host populations and supports the long-term

sustainability of destinations. Scenarios that align with community aspirations are prioritized, implemented, and continuously monitored, reinforcing the importance of adaptive governance and inclusive decision-making.

2.4 From Overtourism to Degrowth and Local Resilience

In response to the social and environmental harms caused by overtourism, scholars have advocated for degrowth strategies that reduce tourism intensity while fostering greater equity and resilience. Dwyer [7], Fletcher et al. [8], and Sharpley [9] argue that shrinking tourism does not necessarily mean economic decline but rather a reconfiguration of its scale and purpose.

Degrowth strategies may involve regulatory mechanisms such as growth moratoria, eco-taxes, and restrictions on transport infrastructure to curb excessive visitation. These changes can promote stronger social cohesion, mitigate environmental degradation, and improve the quality of life for residents.

Crucially, degrowth thinking questions the assumption that tourism growth is inherently positive or necessary. Instead, it invites policymakers and practitioners to reimagine tourism as a process aligned with social equity, environmental justice, and cultural sustainability.

1.3 Technological Innovation and Circularity in Tourism

1.3.1 Industry 4.0 and Digital Tools for Circular Tourism

The integration of Industry 4.0 technologies—such as artificial intelligence (AI), Internet of Things (IoT), blockchain, and digital platforms—has significantly transformed the tourism sector. These tools are increasingly aligned with circular economic principles by enabling real-time monitoring, data-driven optimization, and predictive resource management [11]. Through these capabilities, digital innovation supports dematerialization, waste reduction, and personalized services tailored to sustainable practices.

Startups in tourism have embraced these technologies to develop circular business models that emphasize service over ownership, extend product lifespans, and encourage collaborative consumption. Vargas-Sánchez [11] notes that platforms leveraging sensors, AI, and blockchain allow for better waste tracking, energy efficiency, and transparency in supply chains—elements central to the operationalization of circularity in tourism.

The COVID-19 pandemic accelerated this digital shift, as the tourism industry sought contactless, efficient, and resilient systems. Digitalization became not only a necessity for health and safety but also a catalyst for

embedding circular and sustainable logic in new business models.

1.3.2 Smart Tourism Governance and Adaptive Management

Smart Destination Management Organizations represent a new stage in the evolution of tourism governance. Unlike traditional DMOs focused mainly on promotion, smart DMOs are characterized by their proactive sensing capacities, dynamic adaptability, and strategic use of data to manage tourism flows in real time [10].

According to Gretzel [10], these organizations act as stewards of sustainability and social justice, using digital infrastructure to align tourism operations with broader territorial objectives. They foster coordination among stakeholders, improve responsiveness to environmental pressures, and integrate real-time decision-making tools to balance supply and demand within carrying capacities.

This digitally enhanced governance structure facilitates the transition toward circular tourism by creating feedback systems, predictive analytics, and participatory platforms that support responsible behavior among tourists and service providers.

1.3.3 Ethical Risks and Inclusive Innovation

Despite its potential, the technological transition is not without risks. Gelter and Malagón-Vélez [12] [13] emphasize that dominant narratives around smart tourism and circular innovation often overlook issues of accessibility, transparency, and digital justice. The deployment of advanced technologies without considering social context may exacerbate existing inequalities, exclude marginalized groups, or reinforce centralized control over tourism data.

Moreover, the lack of inclusive digital design, insufficient investment in rural or underserved areas, and algorithmic biases present serious obstacles to equitable innovation. Without ethical oversight, circular technologies risk being co-opted for marketing purposes without delivering substantive environmental or social benefits.

As González Arencibia [16] argues, the convergence of circularity and digitalization must be governed by clear ethical frameworks, robust public regulation, and participatory mechanisms that ensure benefits are widely distributed. Innovation must be inclusive, accountable, and aligned with the principles of environmental protection and social equity.

1.4 Integrated Approaches and Territorial Transitions in Tourism

1.4.1 The Need for Systemic Convergence

Tourism transitions toward circularity and justice require more than isolated interventions. Recent literature

emphasizes the importance of integrative frameworks that connect environmental sustainability with social equity, territorial cohesion, and technological innovation. Scholars such as Hall and Gössling argue that sustainable tourism cannot be achieved through business-as-usual paradigms but must emerge from systemic shifts in policy, governance, and values [17].

This convergence implies recognizing tourism as a complex socioecological system—embedded in spatial, cultural, and institutional contexts—that interacts with broader challenges such as climate change, urbanization, and economic inequality. Circular strategies must therefore be contextualized, participatory, and capable of regenerating local capacities rather than imposing external solutions.

1.4.2 Tourism and Territorial Resilience

Territorial approaches to tourism consider the unique configurations of each destination: its ecosystems, cultural heritage, political institutions, and community dynamics. In this sense, transitions toward circularity are also transitions in governance, identity, and power. Rather than applying standardized sustainability templates, integrated approaches aim to strengthen local agency, build adaptive capacity, and foster long-term territorial resilience.

Patrick Schröder and colleagues [18] stress that circular policies in Latin America and the Caribbean must be tailored to the region's socioeconomic realities, including informality, environmental vulnerability, and social fragmentation. Similarly, González Arencibia [16] highlights the potential of digital tools to reinforce circular transitions only when they are aligned with inclusive, territorially grounded strategies.

1.4.3 Ethical, Political, and Epistemic Dimensions of Integration

A critical understanding of transitions toward circular and regenerative tourism must account for both structural inequalities and the complex networks through which tourism practices materialize. From a political economic perspective, Bianchi [19] emphasizes that tourism is embedded in global capitalist systems where state power, capital accumulation, and social disparities deeply shape its development. Structural injustices—such as exploitative labor conditions, privatization of public assets, and uneven benefit distribution—remain key obstacles to achieving socially just tourism. In this context, circular economy strategies risk becoming superficial if they do not confront these underlying power dynamics. For circular tourism to be genuinely transformative, it must address the systemic roots of inequality and move beyond merely technical solutions.

In parallel, Actor-Network Theory (ANT), as presented by Zhu Feng [20], offers valuable methodological tools for

examining how both human and non-human actors—such as technologies, infrastructures, and environmental systems—co-produce tourism realities. ANT is especially relevant for studying digital innovations within circular tourism, as it reveals how platforms, sensors, regulations, and community practices interact within broader socio-material networks. This approach complements structural critiques by enabling a fine-grained analysis of how power and change operate through distributed relations across territories.

Together, these perspectives support the article's core proposition: that the integration of circular economy, justice, and technology in tourism cannot rely on isolated best practices, but requires systemic, context-sensitive strategies grounded in both critical analysis and networked thinking.

2. Methodology

This study employs a qualitative, exploratory design to identify and synthesize practices that incorporate Circular Economy principles, social justice, and technological innovation within the tourism sector. The methodology involves a comprehensive documentary review and comparative case analysis, utilizing critical interpretative methods for support.

2.1 Data Collection and Selection Criteria

We used purposive sampling to select empirical and theoretical sources from 2014 to 2024, using Scopus, ScienceDirect, and Google Scholar. The search included terms like "circular economy + tourism", "community-based tourism + justice", and "digital innovation + sustainable tourism". We ended up with 20 sources: peer-reviewed articles, institutional reports (e.g., [3]), and case studies mainly from Latin America and Southern Europe. Selection focused on:

- CE practices beyond environmental efficiency.
- Digital tools for sustainability and territorial regeneration.
- Community-based tourism models tackling power imbalances.
- Proposals combining justice and innovation in tourism transitions.

2.2 Analytical Strategy

A thematic content analysis with inductive coding was conducted, identifying recurring categories and critical dimensions. Results were organized into four axes:

- Environmental strategies (e.g., circular infrastructure, waste reduction)

- Technological enablers (e.g., smart governance, digital platforms)
- Social justice mechanisms (e.g., redistribution, inclusion)
- Territorial approaches (e.g., community agency, regenerative processes)

This framework facilitated a comparative reading of the cases, aiming to identify the best practices and uncover structural gaps and systemic tensions.

3. Results

Tourism is increasingly adopting diverse circular strategies, including material reuse in infrastructure and waste reduction in hospitality. Some destinations use eco-design, closed-loop food systems, and zero-waste events [1], [2]. However, most efforts focus on environmental aspects, with few initiatives addressing inclusive governance or redistributive mechanisms.

3.1 Community-based and Justice-Oriented Cases

Two cases exemplify integrative and socially grounded approaches:

- Tosepan Cooperative (Mexico): This cooperative combines agroecological farming, circular food systems, and community-managed ecotourism. It strengthens cultural identity, autonomy, and circular value creation through the use of local currencies and traditional knowledge [6].
- Rede BATUC (Brazil): This network of Afro-Brazilian and Indigenous tourism projects promotes heritage-based circular tourism focused on environmental recovery and socio-spiritual well-being.

These examples illustrate how circular tourism can be employed as a tool for resistance and cultural regeneration, rather than merely for market adaptation.

3.2 Role of Technology in Circular Transitions

Digital tools help implement CE by offering real-time monitoring, predictive resource management, and efficiency optimization. Smart DMOs balance tourism flows and enforce sustainability using data analytics.

However, concerns about data ownership, algorithmic bias, and the exclusion of communities without digital infrastructure persist. Many platforms focus on efficiency without considering ethical design or social inclusion.

3.3 Gaps and Opportunities for Territorial Integration

Few initiatives integrate environmental, technological, social, and territorial dimensions successfully. Projects

often focus on isolated aspects without fostering systemic change. The Circular Tourism Innovation Audit could help destinations assess their circular performance and align efforts with sustainability goals.

3.4 CTIA Framework: Dimensions and Operational Scope

The Circular Tourism Innovation Audit is a diagnostic framework aimed at evaluating the transition of tourism destinations towards circular, equitable, and innovative models. Unlike methodologies that focus exclusively on environmental efficiency or technological deployment, CTIA proposes a comprehensive evaluation across four interconnected dimensions:

- Environmental Performance: This includes indicators such as waste reduction, energy efficiency, utilization of recycled or local materials, and ecosystem preservation.
- Technological Integration: This dimension assesses the implementation of emerging technologies (e.g., sensors, digital platforms, artificial intelligence) based on their contribution to sustainability, transparency, and smart governance.
- Social Equity: This considers mechanisms for redistribution, inclusion of local communities, recognition of traditional knowledge, and active participation in decision-making processes.
- Territorial Coherence: This examines the alignment of tourism practices with the values, capabilities, and aspirations of the territory, promoting participatory governance, cultural regeneration, and local sovereignty.

Table 1 presents the four core dimensions of the Circular Tourism Innovation Audit, along with suggested indicators and real-world examples, providing a practical reference for strengthening circular strategies in tourism destinations. Figure 1 illustrates the structural composition of the CTIA, highlighting the interconnection between environmental performance, technological integration, social equity, and territorial coherence. Together, the table and diagram underscore the systemic and interdependent nature of circular transitions in tourism.

Dimension	Suggested Indicators	Practical Examples
Environmental Performance	Waste management, closed-loop water systems, use of local and biodegradable materials	Zero-waste events, eco-certified hotels
Technological Integration	Open platforms, sensors for carrying capacity, resource traceability	Smart DMOs, mobile apps for equitable tourist distribution

Social Equity	Community participation, decent employment, inclusion of marginalized groups	Tourism cooperatives, use of local currencies
Territorial Coherence	Alignment with local development plans, heritage protection, cultural autonomy	Indigenous or rural tourism projects managed by local communities

Table 1

Dimensions and Indicators of the CTIA for Circular Tourism Assessment

Source: Own elaboration based on reviewed literature and case analysis

Rather than providing a one-size-fits-all model, CTIA functions as an adaptable and participatory framework that can be co-developed with local stakeholders. Its objective is to guide tourism actors, institutions, and collaborative networks in designing transformation strategies that extend beyond technical sustainability, placing territorial justice and social resilience at the forefront.

A broader understanding of circularity provides a crucial route for tourism to become a force for territorial regeneration and social change. The CTIA framework highlights that transitions are not just technical but also political and ethical, based on local contexts and collective efforts. By focusing on equity, resilience, and community involvement, destinations can achieve truly regenerative futures.

4. Conclusions

The shift from linear, consumption-driven tourism to regenerative and equitable models is both urgent and structurally necessary. The concept of a circular economy, when considered beyond its technical and environmental aspects, provides an important framework for this transformation. However, this study finds that most circular strategies in tourism are fragmented, technocentric, and not sufficiently aligned with principles of social justice and territorial agency.

An analysis of both academic literature and real-world experiences indicates that circularity alone is insufficient to address the various challenges facing tourism, such as ecological issues, social exclusion, and digital disparities. Instead, circularity should be integrated with redistributive frameworks, participatory governance, and context-sensitive innovation to serve as a pathway toward equity and resilience.

The cases of Tosepan in Mexico and Rede BATUC in Brazil illustrate that circular tourism can function as more than a sustainability tool; it can also support cultural revitalization, territorial sovereignty, and epistemic justice. These initiatives leverage technology not as an end in itself but as a means to enhance community autonomy, preserve ancestral knowledge, and facilitate ethical forms of exchange. They emphasize that innovation must be grounded in care, historical context, and collective goals, rather than solely in data optimization.

Despite these positive examples, the study identifies continuing barriers: limited policy support, the prevalence of efficiency-focused metrics, inadequate inclusive digital infrastructures, and a disconnect between technological agendas and grassroots realities. In this context, the Circular Tourism Innovation Audit is proposed as a flexible diagnostic framework to help destinations evaluate and guide their circular transitions. Its four dimensions—environmental, technological, social, and territorial—are intended to be adapted and co-constructed with local actors.

Future research should aim to validate the CTIA tool through participatory pilot programs, refine its indicators based on community feedback, and explore its applicability in diverse territorial settings. It is also essential to integrate CTIA with broader planning instruments,

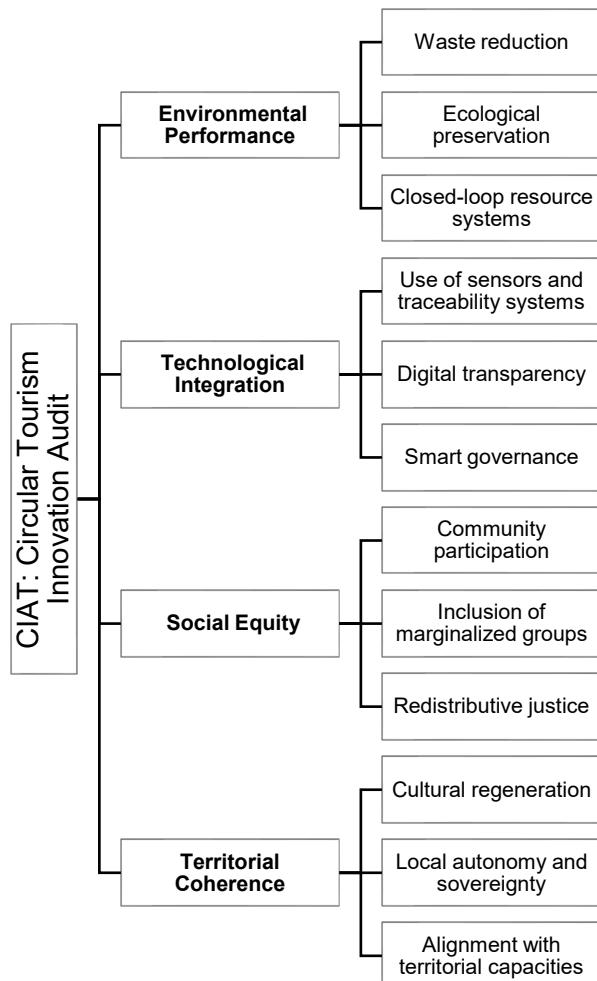


Figure 1. Structure of the Circular Tourism Innovation Audit

Source: Own elaboration

regional policies, and international frameworks like the SDGs, ensuring that justice remains central to any innovation process.

In conclusion, transforming tourism requires more than tools; it necessitates political commitment, ethical reflection, and collective vision. The pathways to circularity may not be straightforward, but they must adhere to principles of justice.

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