

From Fire to Light: Technological Innovation and Sustainability in Christmas Celebrations of Domestic Regenerative Tourism

Do Fogo à Luz: Inovação Tecnológica e Sustentabilidade nas Celebrações Natalinas do Turismo Regenerativo Doméstico

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Abstract

This study analyzes the interaction between technological innovation and regenerative, sustainable tourism planning in the Chilean cities of Valparaíso and Iquique. It examines how Christmas celebrations—traditionally centered on fireworks—are being transformed through the adoption of clean technologies such as drone light shows and LED lighting, generating interconnected economic, social, environmental, and governance-related impacts at the local level. Using a qualitative methodology grounded in hermeneutic analysis and grounded theory, discourses from seven key informants representing public, private, and social sectors were analyzed through a process of systematic triangulation. Four interrelated guiding categories emerged: Economic Representation of Domestic Tourism (ERDT), Social Perspectives of Domestic Tourism (SPDT), Environmentally Friendly Domestic Tourism (EFDT), and Technology in Local Sustainable Tourism (TLST). The results reveal that the integration of

sustainable technologies not only reduces perceived environmental and acoustic impacts but also acts as a catalyst for local economic dynamization by strengthening SMEs, generating temporary employment, and increasing visitor flows during the festive period. Simultaneously, these practices foster social inclusion, community participation, and cultural identity, reinforcing collaborative and territorially embedded governance models. Technology emerges as a transversal enabling factor that connects sustainability objectives with data-informed decision-making and innovative tourist experiences. Overall, the findings demonstrate that Christmas tourism can be reconceptualized as a strategic tool for regenerative territorial development when guided by sustainability principles, participatory governance, and technological innovation. This approach contributes to the advancement of multiple Sustainable Development Goals (SDGs), particularly those related to health and well-being, decent work and economic growth, responsible consumption and production, sustainable cities and communities, and climate action.

Keywords: Regenerative sustainable tourism, clean technologies, territorial tourism development, social inclusion, festive events.

JEL: Z32, Q01, R11, Z32, Q01, O33, R11

Resumo

Este estudo analisa a interação entre a inovação tecnológica e o planeamento turístico regenerativo e sustentável nas cidades chilenas de Valparaíso e Iquique. Examina como as celebrações natalinas tradicionalmente centradas no uso de fogos de artifício estão sendo transformadas por meio da adoção de tecnologias limpas, como espetáculos de drones e iluminação LED, gerando impactos inter-relacionados de natureza econômica, social, ambiental e de governança em nível local. Utilizando uma metodologia qualitativa baseada na análise hermenêutica e na teoria fundamentada, foram analisados os discursos de sete informantes-chave provenientes dos setores público, privado e social, por meio de um processo de triangulação sistemática. Emergiram quatro categorias orientadoras inter-relacionadas: Representação Econômica do Turismo Doméstico (ERDT), Perspectivas Sociais do Turismo Doméstico (SPDT), Turismo Doméstico Ambientalmente Responsável (EFDT) e Tecnologia no Turismo Local Sustentável (TLST). Os resultados evidenciam que a integração de tecnologias sustentáveis não apenas reduz de forma percebida os impactos ambientais e acústicos, mas também atua como um catalisador da dinamização econômica local, fortalecendo as PMEs, gerando empregos temporários e aumentando o fluxo de visitantes durante o período festivo. Simultaneamente, essas práticas promovem inclusão social, participação comunitária e fortalecimento da identidade cultural, reforçando modelos de governança colaborativa e territorialmente integrados. A tecnologia emerge como um fator transversal que articula os objetivos de sustentabilidade com a tomada de decisão orientada por dados e a criação de experiências turísticas inovadoras. Em conjunto, os achados demonstram que o turismo natalino pode ser reconceitualizado como uma ferramenta estratégica de desenvolvimento territorial regenerativo quando orientado por princípios de sustentabilidade, governança participativa e inovação tecnológica. Essa abordagem contribui para o avanço de múltiplos Objetivos de Desenvolvimento Sustentável (ODS), especialmente aqueles relacionados à saúde e bem-estar, trabalho decente e crescimento econômico, consumo e produção responsáveis, cidades e comunidades sustentáveis e ação climática.

Palavras-chave: turismo sustentável regenerativo, tecnologias limpas, desenvolvimento turístico territorial, inclusão social, eventos festivos

JEL: Z32, Q01, R11, Z32, Q01, O33, R11

1. INTRODUCTION

Globally, China has become a benchmark in transitioning to sustainable celebrations by replacing traditional fireworks with drone light shows and LED technology, generating positive multidimensional impacts (Weng et al., 2023). Economically, these innovations have fostered new industries, reduced costs, and created specialized jobs (Fiorentin et al., 2019). Socially, they promote inclusive participation through accessible urban displays and cultural symbols that strengthen community identity. Cities like Shanghai, Xi'an, and Beijing have seen significant reductions in air and noise pollution during large celebrations, aligning with regenerative tourism principles (Vujičić et al., 2022). Christmas, as a peak domestic tourism period, features events that stimulate local economies and promote responsible travel, supporting SDGs 3, 8, and 12 (Acevedo-Duque et al., 2022; UNWTO, 2025).

Economically, domestic tourism during Christmas boosts sectors like hospitality and retail, benefiting SMEs and local entrepreneurs, thus strengthening regional production and reducing inequalities (Acevedo-Duque et al., 2021; Lam-González et al., 2019). Institutional coordination among public, private, and civil actors enhances tourism offerings and resource circulation, consolidating resilient local economies (Picken, 2023; Zhang & Zhang, 2023). Socially, Christmas tourism reinforces community cohesion and belonging through tourist-resident interaction and inclusive event design that accommodates diverse populations (Nguyen & Nguyen, 2023; Wang et al., 2023; Viana-Lora et al., 2023; Elorrieta et al., 2022).

Environmental challenges persist, including pollution and resource overuse, with fireworks harming ecosystems in coastal Chilean cities (MacNeill & Wozniak, 2018; Su et al., 2018; Godovykh et al., 2024). Sustainable alternatives like drone shows and LED lighting, exemplified in Iquique, reduce environmental impacts while delivering compelling spectacles (Hiltunen et al., 2016; Parker et al., 2024; Acevedo-Duque et al., 2022). These innovations support SDGs 11 and 13 and offer economic benefits by lowering costs and optimizing resources (Warner et al., 2023; Gan et al., 2023). Despite advances, research gaps remain regarding institutional influences on economic, social, environmental, and biodiversity effects of domestic Christmas tourism (Lv et al., 2024; Seyfi et al., 2024).

This study addresses: How does the use of sustainable technologies in Christmas celebrations affect economic development, social inclusion, and environmental protection in regional tourism contexts like Valparaíso and Iquique? Focusing on these culturally and ecologically significant cities with diverse management models, the study aims to provide empirical evidence for decision-making aligned with economic growth, social inclusion, and environmental stewardship.

The article is structured into five sections: (1) introduction and research question; (2) literature review on sustainable tourism and territorial development; (3) methodology with qualitative analysis based on grounded theory and Five-Phase Hermeneutic Analysis by González-Díaz et al. (2022).; (4) results; and (5) discussion and conclusions with recommendations for advancing responsible, regenerative Christmas tourism.

2. THEORETICAL CONTEXTUALIZATION

2.1. Economic representation in domestic Christmas tourism

Christmas spectacles offer a strategic opportunity to boost domestic tourism, strengthen local economies, and promote sustainable economic and social practices (Lee, 2021). Their impact goes beyond economics, enhancing social well-being and environmental protection. Harnessing this potential responsibly yields immediate benefits and supports sustainable, equitable development in host communities, aligning festivities with global sustainability goals (Basnyat et al., 2020).

In Chile, the Christmas season is a key period for domestic tourism growth and the valorisation of local cultural traditions (Christou & Pericleous, 2023). Themed events and spectacles are recognized as catalysts for the Sustainable Development Goals (SDGs) (Yasir et al., 2024), particularly SDG 3 (Good Health and Well-being), SDG 8 (Decent Work and Economic Growth), and SDG 12 (Responsible Consumption and Production), given their influence on social well-being, inclusive economic growth, and responsible resource use (see Figure 1).

Figure 1. New Year 2025 in Iquique, Tarapacá Region, Chile.



Source: Municipal Council of Iquique, Drone Festival for New Year 2025 in Iquique, Tarapacá Region, Chile.

2.2. Economic and social perspectives on domestic Christmas tourism

Christmas festivities in Chile generate significant economic spillovers, particularly benefiting small and medium-sized enterprises (SMEs) that supply products and services to local and national tourists (Báez-Montenegro et al., 2016). Events such as Christmas fairs and artisanal markets provide vital platforms for local entrepreneurs to increase income and strengthen regional value chains, fostering economic dynamism that contributes to reducing socioeconomic disparities and promoting inclusive growth (Acevedo-Duque et al., 2022; UNWTO).

From a social standpoint, festive celebrations reinforce community ties and social cohesion by creating accessible, diverse spaces that encourage interaction between tourists and residents, thus fostering cultural pride and a sense of belonging (Lee, Han, & Ko, 2020; Mora-Rivera, Cerón-Monroy, & García-Mora, 2019). Active community participation in event organization enhances social integration and ensures that benefits extend beyond economic gains (Lv, 2024).

Moreover, Christmas events promote social inclusion by actively involving marginalized groups such as older adults, people with disabilities, and Indigenous communities in planning and execution. This approach strengthens diversity and equity while enriching the cultural experience and empowering these groups to showcase their contributions to social and cultural life (Seyfi et al., 2024; Zhao, Jiang, & Ke, 2023) (see Figure 2).

Figure 2. Cavanha Beach, Tarapacá Region, Chile



Source: Municipal Council of Iquique, Cavanha Beach, Tarapacá Region, Chile.

2.3. Social and environmental challenges in festive domestic tourism

Festive celebrations, including Christmas events, face social challenges such as cultural gentrification and the unintended exclusion of certain groups due to economic or social barriers (Zhao, 2022). Addressing these requires a conscious, participatory approach that promotes inclusive, affordable access policies, enabling Christmas festivities to evolve into socially responsible models prioritizing collective well-being and equitable benefit distribution (Zhang et al., 2024).

Environmental concerns are also prominent. Traditional fireworks contribute significantly to air and noise pollution and negatively affect local wildlife (Dong & Wu, 2013). Sustainable alternatives like drone and LED light shows offer visually captivating experiences with reduced environmental impact (He, 2012), aligning with SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).

A notable case is Valparaíso, Chile, where the iconic fireworks display has sparked debate over its environmental consequences (Kallou, Kikilia, & Kalogiannakis, 2023), prompting the search for sustainable options that balance cultural preservation with environmental responsibility (Acevedo-Duque, 2022). Similarly, Iquique has adopted drone shows as a cost-effective, sustainable alternative, illustrating how technological innovation supports sustainable tourism (see Figure 3).

Figure 3. New Year 2025 Fireworks Festival, Coastline of Valparaíso and Viña del Mar, Chile.



Source: Puranoticia.cl, New Year 2025 Fireworks Festival, Coastline of Valparaíso and Viña del Mar, Chile.

2.4. Institutional, economic, and technological dimensions of Christmas domestic tourism

There is a notable research gap regarding how institutional and economic factors affect Christmas tourism, particularly in balancing growth with natural resource protection (Pegkas, 2020). While this tourism fosters local development, it also increases waste and ecological pressure. The absence of studies on regulatory quality and environmental standards limits the development of effective policies.

At the same time, technology offers tools to improve sustainability and manage tourism flows. Digital platforms and mobile apps increase destination visibility, support real-time decision-making, and promote lesser-known areas (Fiorentin et al., 2019). Tools like Google Maps and Airbnb Experiences enable tourists to access curated content and connect directly with local providers, reinforcing the circular economy and supporting more balanced and responsible domestic tourism (see Figure 4).

Figure 4. New drone show featuring the figure of El Longino and the coat of arms of the Municipality of Iquique



Source: Soy del Norte Daily, El Longino, 2025.

2.5. Drones and immersive technologies in the promotion of domestic tourism

The use of drones in major events like New Year's Eve is transforming domestic tourism promotion by delivering synchronized aerial shows that highlight cultural and touristic identity (Weng et al., 2023). These performances, shared widely on platforms like Instagram and TikTok, generate viral visual content that attracts attention both on-site and online.

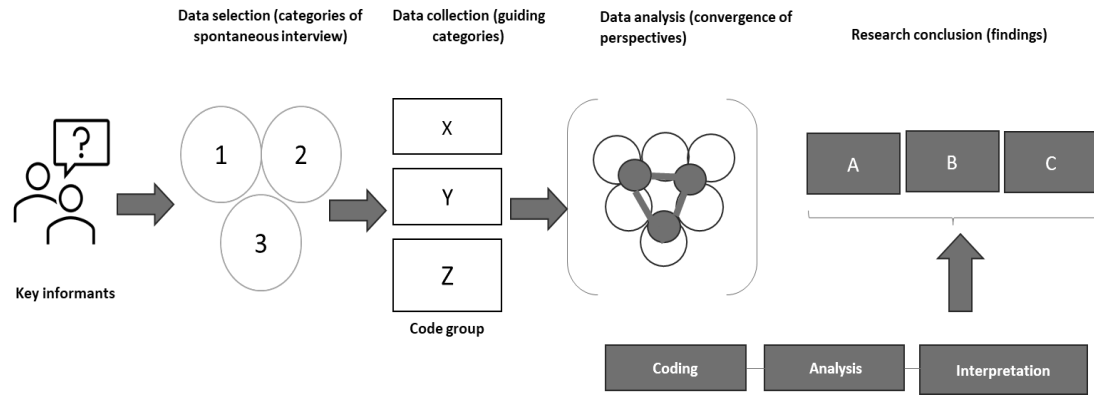
According to Weng et al. (2023), such innovations boost interest and trust in destinations, increasing visitor numbers while reducing noise and air pollution positioning drone shows as sustainable, high-impact promotional tools. Virtual reality (VR) and augmented reality (AR) also enhance domestic tourism by offering immersive previews of historical sites, museums, and natural parks. Vujičić et al. (2022) note that these technologies enrich educational and cultural engagement, support itinerary planning, and foster deeper emotional connections with destinations.

3. METHODOLOGY

This study employed a qualitative approach grounded in the post-positivist grounded theory method developed by Strauss and Corbin (1990), with the aim of constructing a substantive theory that explains the phenomenon under investigation. An emergent and inductive research design was applied, reconstructing the lived experiences of the participants within their natural settings.

In its initial phase, the research followed the hermeneutic analysis pathway structured in five stages, as proposed by González-Díaz et al. (2022). This hermeneutic approach enabled a deep and context-sensitive analysis of the cultural and organizational dynamics associated with scientific research, thereby enhancing the understanding of the factors that drive the generation and dissemination of knowledge in the fields of tourism and sustainability (see Figure 5).

Figure 5. Phases of hermeneutic analysis applied in the study.



Source: Five-Phase Hermeneutic Analysis by González-Díaz et al. (2022).

Phase 1. The study addresses the key research question by challenging different problem approaches and guiding the research direction. The methodology was applied according to the informants' perspectives on each specific topic.

Phase 2. Spontaneous Categorical Interviews (SCI). The construction of SCIs is based on three approaches that direct the research throughout the analysis; these were applied through the collection of information extracted from the informants' discourse on social networks and the press, with the aim of determining the guiding categories.

Phase 3. Guiding Categories (GC). The coding of quotations was performed considering responses from seven key informants from the public, private, and social sectors, grouping them into three approaches: Economic Representation in Domestic Tourism (ERDT), Social Perspectives of Domestic Tourism (SPDT), Environmentally Unfriendly Domestic Tourism (EUDT), and Technology in Local Sustainable Tourism (TLST). The distribution of the unit of analysis is presented below, resulting in the creation of an Explanatory Model for the Sustainable Development of Local Tourism (see Table 2).

Phase 4. Convergence (C). Informants' convergence was grouped according to the guiding categories through quotations and open coding, establishing a semantic network highlighting the rooting and density of each category.

Phase 5. Analysis and Interpretation of Results (AIR). Using the discourses, spatial networks were generated that enriched the relevant information provided by the key informants, fostering new theory for knowledge management.

3.1. Unit of analysis

The unit of analysis consisted of key informants selected through purposive sampling, in accordance with the principles of qualitative research and grounded theory (Strauss & Corbin, 1990; González-Díaz et al., 2022). A total of seven participants ($n = 7$) were included, whose public and professional discourses represent diverse institutional sectors directly involved in the planning, regulation, and implementation of tourism activities associated with Christmas celebrations in Valparaíso and Iquique. The sample comprised local government representatives, tourism and cultural event organizers, and actors from the gastronomy and hospitality sectors, all of whom play relevant roles in territorial tourism dynamics.

The inclusion criteria were: (i) holding decision-making, coordination, or operational roles related to tourism, cultural events, or territorial development; (ii) having a minimum of five years of professional experience in domestic tourism or festive events; (iii) direct involvement in the organization of Christmas celebrations or other large-scale events; and (iv) the ability to provide informed, practice-based discourse (Ordóñez Ordóñez & Quiroga Coronel, 2023). Exclusion criteria included individuals without direct involvement in decision-making processes, those with less than five years of experience, or actors whose participation in festive activities was occasional or peripheral (Manzano Núñez & García Perdomo, 2016).

The diversity of institutional profiles enabled analytical triangulation, allowing the economic, social, environmental, and technological dimensions of Christmas tourism to be examined from

complementary perspectives (Lv et al., 2024). Data were collected through semi-structured interviews and focus groups, facilitating in-depth exploration of discourses and practices related to sustainable festive tourism (Reyes, 2012). The sample size was determined by theoretical saturation, evidenced by the recurrence of emergent categories (see Table 1). While the findings are context-specific to Valparaíso and Iquique (Aignerren, 2009), they offer analytical and theoretical transferability to territories with comparable institutional, cultural, and environmental characteristics.

Table 1

Institution Represented	Region	Sector	Identity code
Representative of the Municipality of Valparaíso Valparaíso Public	Valparaíso Region	Public	IC-1
Representative of the Municipality of Viña del Mar	Valparaíso Region	Public	IC-2
Representative of the Municipality of Viña del Mar	Valparaíso Region	Public	IC-3
Representative of the Hotel Guild	Valparaíso Region	Private	IC-3
Representative of the Municipality of Iquique	Tarapacá Region	Public	IC-4
Representative of the Chamber of Commerce and Tourism of Viña del Mar	Valparaíso Region	Public	IC-5
Representative of the Chamber of Commerce and Tourism of Iquique	Tarapacá Region	Public	IC-6

Source: Own elaboration

3.2. Ethical criteria

Qualitative validity and methodological integrity were ensured through the application of data triangulation strategies, reflexivity, and verification of theoretical saturation (De Masi et al., 2021). Feedback was provided to participants to corroborate the coherence and credibility of the findings, and a continuous reflexivity approach was adopted to minimize biases and ethically influence the research process. Additionally, information was obtained from publicly available data on major social networks of companies belonging to competent organizations, ensuring compliance with ethical principles according to the Declaration of Helsinki. Confidentiality of information was protected by storing data on a restricted-access server.

4. RESULTS

Based on the analysed units from key informants who responded to the semi-structured interviews, the scientific evidence shows that these local events strengthen tourism and promote sustainable political, legal, economic, social, ecological, and technological activities. Consequently, an explanatory model was developed that conceptualizes local development for sustainable tourism across four components (or factors): Economic Representation in Domestic Tourism (ERDT), Social Perspectives of Domestic Tourism (SPDT), Environmentally Friendly Domestic Tourism (EFDT), and Technology in Local Sustainable Tourism (TLST) (See Table 2). The impact of local tourism is monitored by applying standards of transparency and accountability in management (See figure 6).

4.1. Results: discourse on economic representation in domestic tourism (ERDT)

The results related to the Economic Representation of Domestic Tourism (ERDT) reveal a clear convergence between the discourses of key informants, the empirical findings of the study, and the evidence reported in the specialized literature on domestic tourism and territorial development (Thurmond, V. A. 2001). The triangulation of these sources shows that Christmas celebrations act as a local economic driver, positively impacting sectors such as commerce, hospitality, and gastronomy, as well as strengthening small and medium-sized enterprises through fairs and festive

events (Báez-Montenegro et al. 2016, Lam-González et al. 2019). Additionally, the generation of temporary employment and labour inclusion of vulnerable groups are identified as recurring effects of these activities, together with the relevance of incorporating economic indicators such as tourist expenditure, hotel occupancy, and service demand to assess the real impact of celebrations (Basnyat et al. 2020, Nguyen & Nguyen 2023). Complementarily, the results indicate that public strategies aimed at promoting domestic tourism contribute to economic decentralization and the diversification of regional income, reinforcing the role of Christmas tourism as an instrument of territorial development (Pegkas 2020, Zhang & Zhang 2023, Seyfi et al. 2024).

"Christmas tourism drives local growth by energizing sectors such as commerce, hospitality, and gastronomy." IC-2.

"Measuring tourism expenditure, hotel occupancy, and service demand enables evaluation of the real impact of celebrations." IC-5.

"Fairs and festive events directly benefit entrepreneurs and small businesses, strengthening the community economy." IC-1.

"Christmas activities create temporary jobs and promote labour inclusion in vulnerable sectors." IC-3.

"Public strategies promoting domestic tourism help decentralize the economy and diversify regional income." IC-4.

4.2. Results: social perspectives of domestic tourism (SPDT)

The results related to the Social Perspectives of Domestic Tourism (SPDT) reveal a consistent convergence between the discourses of key informants, the empirical evidence gathered in this study, and the existing literature on domestic tourism, social cohesion, and community development (Thurmond, V. A. 2001). The triangulation of these sources shows that Christmas celebrations function as inclusive social spaces that foster interaction among diverse social groups, strengthen community participation, and reinforce local identity (Lee, Han & Ko 2020, Viana-Lora, et al 2023, Zhao 2022). Moreover, the findings highlight the role of domestic tourism in revitalizing cultural traditions and promoting accessible event designs that enable equitable participation, thereby contributing to social inclusion and community cohesion dimensions widely recognized in studies on socially sustainable tourism (Mora-Rivera, Cerón-Monroy & García-Mora 2019; Viana-Lora et al., 2023; Seyfi et al., 2024).

"Christmas celebrations integrate people from different social backgrounds, fostering inclusive coexistence spaces." IC-1.

"Local communities actively engage in event planning and execution, strengthening the sense of belonging." IC-6.

"Domestic tourism revitalizes traditions and cultural expressions, reinforcing host community identity." IC-5.

"The celebrations encourage interaction between residents and visitors, generating social ties and community cohesion." IC-3.

"Accessible festival design enables people with diverse abilities and conditions to participate on equal terms." IC-2.

4.3. Results: environmentally friendly domestic tourism (EFDT)

The results associated with Environmentally Friendly Domestic Tourism (EFDT) reveal a clear convergence between the discourses of key informants, the empirical evidence obtained in this study, and the existing literature on sustainable tourism and environmental governance (Thurmond, V. A. 2001). The triangulation of these sources indicates that the incorporation of clean technologies in Christmas celebrations promotes environmentally respectful practices, contributing to the reduction of negative impacts on natural ecosystems (Hiltunen, Pitkänen & Halseth 2016, Godovykh, Alvarez & Fyall 2024). The findings highlight that sustainable actions implemented during festive events support biodiversity conservation and ecosystem protection, particularly in environmentally sensitive areas (MacNeill & Wozniak 2018, Elorrieta et al. 2022). Moreover, the

results show that the use of drones and LED lighting represents an effective alternative to traditional fireworks, significantly reducing air, noise, and light pollution (Fiorentin, Bettanini & Bogoni 2019, Weng et al. 2023). In addition, the evidence emphasizes the importance of compliance with environmental regulations to safeguard parks and ecologically valuable areas, as well as the role of Christmas tourism as a platform for raising public awareness about environmental care and responsible behavior among residents and visitors (He 2012, Dong & Wu 2013, Pegkas 2020, Warner et al. 2023).

"Christmas tourism with clean technologies promotes celebrations respectful of the natural environment." IC-2.

"Sustainable actions during festivities help preserve biodiversity and local ecosystems." IC-5.

"The use of drones and LED lighting reduces pollution, replacing harmful practices such as fireworks." IC-3.

"Celebrations must comply with environmental regulations to protect parks and ecologically valuable areas." IC-4.

"Christmas activities offer opportunities to raise public awareness about environmental care." IC-6.

4.4. Results: technology in local sustainable tourism (TLST)

The results related to Technology in Local Sustainable Tourism (TLST) demonstrate a strong convergence between the discourses of key informants, the empirical evidence of the study, and the existing literature on technological innovation and sustainable tourism management (Thurmond, V. A. 2001). The triangulation of these sources indicates that the integration of technologies such as drones, LED lighting, digital platforms, mobile applications, and immersive tools contributes to the transformation of festive events into more responsible, efficient, and engaging experiences (Vujičić et al. 2022, Weng et al. 2023). The findings show that digital tools support more sustainable event organization by optimizing resources and improving operational efficiency, while applications based on augmented reality enhance visitor experiences without generating physical pressure on the environment (Fiorentin, Bettanini & Bogoni 2019, Gan et al. 2023, Zhang & Zhang 2023). In addition, the results highlight the role of technology in monitoring key environmental variables during mass events, enabling better decision-making and environmental control (Parker et al. 2024, Kallou, Kikilia & Kalogiannakis 2023). Finally, the evidence suggests that investment in sustainable technological systems strengthens destination competitiveness and reinforces long-term environmental commitment within local tourism governance frameworks (Fiorentin et al. 2019, Godovykh, Alvarez & Fyall 2024, Warner et al. 2023).

"Drones and LED lighting transform celebrations into responsible and engaging experiences." IC-3.

"Digital tools enable more efficient and sustainable event organization, optimizing resources." IC-6.

"Apps and augmented reality enrich visitor experience without causing physical impact on the environment." IC-2.

"Technology facilitates the monitoring of key environmental variables during mass events." IC-1.

"Investment in sustainable technological systems strengthens destination competitiveness and environmental commitment." IC-4.

4.5. Results: hermeneutic approach, guiding categories, and category code groups for domestic tourism analysis.

Table 2 presents the analytical structure derived from the hermeneutic and grounded theory-based approach applied in this study (Strauss and Corbin 1990). The table systematizes the relationship between the hermeneutic approach, the guiding categories, and the corresponding category code groups that emerged from the iterative coding process. Through open, axial, and

selective coding, the empirical data were organized into four core dimensions economic, social, ecological, and technological reflecting the multidimensional nature of domestic tourism in festive contexts (González-Díaz et al. 2022). This structure provides analytical transparency and demonstrates how the empirical evidence supports the construction of an explanatory model for sustainable local tourism development, ensuring coherence between the methodological design, the results, and the proposed action-oriented framework (See Table 2).

Table 2. Hermeneutic Approach, Guiding Categories, and Category Code Groups for Domestic Tourism Analysis.

Hermeneutic Approach	Guiding Category	Category Code Group	Authors
Political/Economic Activities	Economic Representation in Domestic Tourism (ERDT)	• Economic development • Economic indicators in domestic tourism • Economic impact of tourism on local communities • Job creation in the domestic tourism sector • Economic policy and domestic tourism	Lee (2021); Pegkas (2020); Sharpley (2020); Acevedo-Duque et al. (2022); UNWTO (2023)
Social Activities	Social Perspectives of Domestic Tourism (SPDT)	• Social inclusion in tourism. • Community participation in tourism activities. • Cultural impact of tourism on local communities. • Social dynamics generated by domestic tourism • Equality and accessibility in domestic tourism activities.	Seyfi et al. (2024); Viana-Lora et al. (2023); Richards (2018); Moscardo (2020); Higgins-Desbiolles (2018)
Ecological Activities	Environmentally Friendly Domestic Tourism (EFDT)	• Ecological sustainability. • Environmental conservation in local tourist destinations. • Low ecological impact tourism. • Sustainable tourism practices in protected areas. • Environmental education for local tourists.	MacNeill & Wozniak (2018); Weng et al. (2023); Buckley (2012); Gössling et al. (2021); UNEP (2022)
Technological Activities	Technology in Local Sustainable Tourism (TLST)	• Use of innovative technologies to promote sustainable tourism. • Digital platforms for local tourism management. • Technological applications to enhance the tourist experience. • Environmental monitoring and technology in tourism. • Sustainable technological infrastructure in local tourist destinations.	Vujičić et al. (2022); Gan et al. (2023); Gretzel et al. (2015); Buhalis & Amaranggana (2015); Neuhofer et al. (2015)

Source: Own elaboration

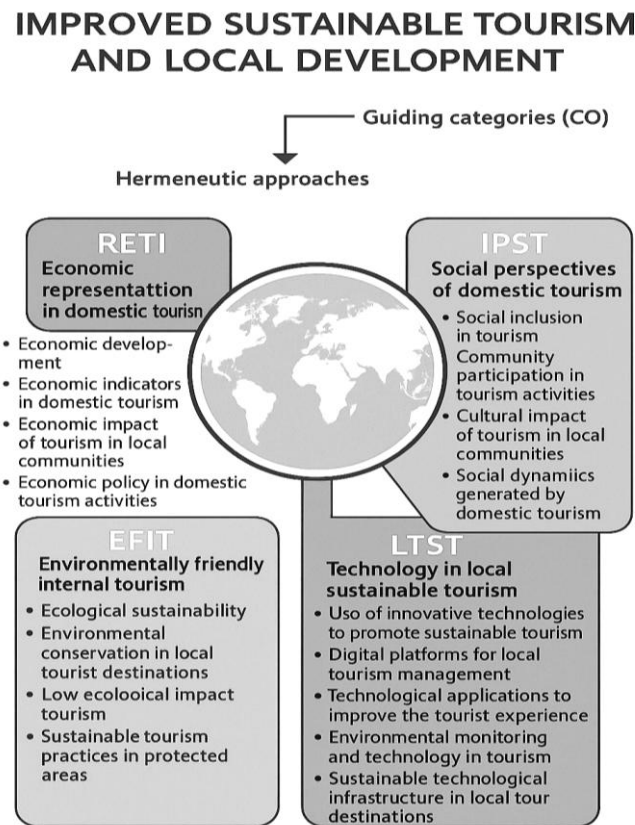
4.6. Results: action model derived from grounded theory

From the perspective of grounded theory, the results of this study enable the construction of an action-oriented model for sustainable local tourism development, emerging from the systematic convergence of key informants' discourses, empirical evidence, and the process of axial and selective coding proposed by Strauss and Corbin (1990). The articulation of the four guiding categories Economic Representation of Domestic Tourism (ERDT), Social Perspectives of Domestic Tourism (SPDT), Environmentally Friendly Domestic Tourism (EFDT), and Technology in Local Sustainable Tourism (TLST) forms a dynamic and interdependent system that explains how Christmas celebrations operate as spaces of territorial action.

Within this model, local economic dynamization and the strengthening of SMEs (Lee, 2021; Acevedo-Duque et al., 2022) are intertwined with processes of social cohesion, community participation, and cultural identity (Viana-Lora et al., 2023; Seyfi et al., 2024), while the adoption of clean technologies and responsible practices contributes to environmental protection and the conservation of local ecosystems (MacNeill & Wozniak, 2018; Weng et al., 2023). Transversally, technology functions as an articulating axis of the model, facilitating resource optimization,

environmental monitoring, and the enhancement of the tourist experience without physical pressure on the territory (Vujičić et al., 2022; Gan et al., 2023). Taken together, these dimensions constitute an explanatory and operational model that guides tourism governance and decision-making from a regenerative, participatory, and sustainable perspective, consistent with the principles of grounded theory by emerging directly from empirical relationships observed in the analysed territorial context and aligning with contemporary approaches to sustainable tourism development (Pegkas, 2020; Picken, 2023) (See figure 6).

Figure 6. Hermeneutic Approach and Guiding Categories with Code Groups Developed by the Authors, 2025.



Source: Own elaboration "Explanatory Model for the Sustainable Development of Local Tourism".

4.7. Results: incorporation of qualitative impact indicators

In line with the qualitative approach and grounded theory, the study incorporates approximate impact indicators constructed from the informed perceptions of key actors, discursive recurrence, and theoretical saturation. These indicators are not intended to provide statistical quantification but rather to evidence empirical trends observed across the economic, social, and environmental dimensions of Christmas tourism. The main impacts identified include the perceived strengthening of local SMEs, the increase in visitor flows during the festive period, the perceived reduction in air and noise pollution associated with the replacement of fireworks with drone shows and LED lighting, and the enhancement of social cohesion and community participation in event organization. These qualitative indicators reinforce the empirical consistency of the findings and enable their linkage to practical implications and the 2030 Agenda (See table 3).

Table 3

Guiding Category	Empirical Evidence (Qualitative Indicators)	Practical Implications	Related SDGs	Supporting Authors
Economic Representation in Domestic Tourism (ERDT)	• Perceived increase in domestic visitors during the Christmas period • Strengthening of local SMEs and temporary job creation • Increased demand for gastronomy, accommodation, and local services	• Strengthening of local economic resilience • Evidence-based planning for festive tourism • Promotion of inclusive territorial economic development	SDG 8 (Decent Work and Economic Growth) SDG 11 (Sustainable Cities and Communities)	Sharpley (2020); Lee (2021); Pegkas (2020); Acevedo-Duque et al. (2022); UNWTO (2023)
Social Perspectives of Domestic Tourism (SPDT)	• Increased community participation in event organization • Strengthened sense of belonging and cultural identity • Improved accessibility and social inclusion in festive activities	• Design of inclusive and participatory tourism models • Reinforcement of social cohesion and community empowerment • Promotion of social innovation in tourism governance	SDG 3 (Good Health and Well-being) SDG 10 (Reduced Inequalities) SDG 11 (Sustainable Cities and Communities)	Higgins-Desbiolles (2018); Richards (2018); Moscardo (2020); Seyfi et al. (2024); Viana-Lora et al. (2023)
Environmentally Friendly Domestic Tourism (EFDt)	• Perceived reduction in air and noise pollution • Lower disturbance of coastal and urban ecosystems • Increased environmental awareness among residents and visitors	• Adoption of clean technologies in festive events • Biodiversity protection and ecosystem conservation • Integration of environmental education into tourism practices	SDG 12 (Responsible Consumption and Production) SDG 13 (Climate Action) SDG 15 (Life on Land)	Buckley (2012); Gössling et al. (2021); MacNeill & Wozniak (2018); Weng et al. (2023); UNEP (2022)
Technology in Local Sustainable Tourism (TLST)	• Improved efficiency in event organization and resource use • Enhanced visitor experience without physical pressure on the territory • Environmental monitoring during mass events	• Strengthening smart and sustainable tourism governance • Data-informed decision-making • Increased destination competitiveness and innovation capacity	SDG 9 (Industry, Innovation and Infrastructure) SDG 11 (Sustainable Cities and Communities)	Buhalis & Amaranggana (2015); Gretzel et al. (2015); Vujičić et al. (2022); Gan et al. (2023); Godovykh et al. (2024)

Source: Authors' own elaboration based on empirical data.

5. DISCUSSION

The findings of this study demonstrate that Christmas domestic tourism, when strategically guided by principles of sustainability, territorial planning, and technological innovation, can function as a catalyst for regenerative regional development, rather than merely as a seasonal economic activity (Acevedo-Duque et al., 2022; Higgins-Desbiolles, 2018). From a grounded theory perspective, the results reveal an interconnected system in which economic, social, environmental, and technological dimensions mutually reinforce one another, supporting the emergence of an action-oriented model for sustainable local tourism governance.

From the economic dimension (ERDT), the results confirm that Christmas celebrations significantly contribute to local economic dynamization by strengthening SMEs, generating temporary employment, and stimulating commerce, hospitality, and service sectors. These findings are consistent with previous studies highlighting domestic tourism as a stabilizing force for local economies, particularly in contexts vulnerable to external shocks (Sharpley, 2020; Lee, 2021; UNWTO, 2023). Moreover, the incorporation of economic indicators into tourism planning aligns with evidence-based governance approaches, enabling more efficient allocation of resources and improved monitoring of territorial economic impacts (Pegkas, 2020). This reinforces the notion that festive tourism, when properly managed, transcends short-term consumption and contributes to sustained local value creation.

In the social dimension (SPDT), the study highlights how Christmas tourism fosters social inclusion, community participation, and cultural revitalization. The active involvement of local communities in the design and execution of events strengthens social capital, reinforces collective identity, and enhances the sense of belonging among residents and visitors alike. These findings align with the literature on community-based and socially sustainable tourism, which emphasizes participation, accessibility, and cultural continuity as key drivers of human development (Basnyat et al., 2020; Moscardo, 2020; Seyfi et al., 2024). Furthermore, the emphasis on equality and accessibility contributes to the democratization of tourism experiences, supporting broader social justice and inclusion agendas within domestic tourism frameworks (Higgins-Desbiolles, 2018; Richards, 2018).

From an environmental perspective (EFDT), the results corroborate that the adoption of clean technologies such as drones and LED lighting represents a viable and effective alternative to environmentally harmful practices like fireworks. This transition significantly reduces atmospheric, acoustic, and ecological impacts, particularly in sensitive coastal and urban ecosystems. These findings are consistent with prior research emphasizing the role of low-impact tourism practices and environmental regulation in protecting biodiversity and promoting ecological sustainability (Buckley, 2012; Gössling et al., 2021; Weng et al., 2023). In contexts such as Iquique, where the negative effects of fireworks on coastal biodiversity have been documented, the study provides empirical support for policy shifts toward environmentally responsible celebration models (Elorrieta et al., 2022). Additionally, the role of festive events as platforms for environmental education reinforces their potential to promote pro-environmental awareness and behavioural change among local populations (UNEP, 2022).

Finally, the technological dimension (TLST) emerges as a transversal and coordinating factor within the proposed model. The integration of digital platforms, environmental monitoring systems, and immersive technologies enhances both operational efficiency and visitor experience, while minimizing physical pressure on destinations. These results are aligned with the smart and sustainable tourism literature, which identifies technology as a key enabler of data-driven, adaptive, and resilient tourism governance (Buhalis & Amaranggana, 2015; Gretzel et al., 2015; Vujičić et al., 2022). Moreover, recent studies highlight that technological innovation not only improves management capacities but also strengthens destination competitiveness and long-term environmental commitment (Godovykh et al., 2024; Gan et al., 2023). In this sense, technology acts as an integrative mechanism that connects economic performance, social inclusion, and environmental stewardship within a unified sustainability framework.

Overall, the discussion demonstrates that Christmas domestic tourism, when approached through an integrated and grounded theoretical lens, constitutes a multidimensional development strategy rather than an isolated festive phenomenon. The study contributes to the literature by empirically substantiating a holistic model of sustainable local tourism that is context-sensitive, participatory, and technologically enabled, offering valuable insights for policymakers, destination managers, and scholars concerned with the future of domestic and festive tourism systems.

6. CONCLUSIONS, CONTRIBUTIONS, AND FUTURE RESEARCH DIRECTIONS

The objective of this research was to analyse how Christmas domestic tourism, when implemented through a strategic, sustainable, and territorially grounded approach, can contribute to regenerative local development. Using a qualitative methodology supported by a grounded theory framework, the study examined the economic, social, environmental, and technological dimensions of festive tourism in the cities of Valparaíso and Iquique, with the aim of understanding its potential as a tool for sustainable tourism governance.

The results allow us to conclude that Christmas tourism, when properly planned and managed, can function as a significant catalyst for regenerative territorial development rather than merely a seasonal cultural activity. The cases of Valparaíso and Iquique demonstrate that it is possible to transition from traditional celebration models toward more conscious, inclusive, and environmentally respectful practices. The incorporation of clean technologies such as drones and LED lighting not only reduces environmental and acoustic impacts but also optimizes resources and innovatively enhances the tourist experience. From an economic perspective, festive events stimulate local commerce, strengthen small and medium-sized enterprises, and generate temporary employment, particularly benefiting vulnerable sectors. Socially, the findings reveal increased inclusion and community participation, reinforcing cultural identity, social cohesion, and a sense of territorial belonging.

In this sense, the study makes several key contributions. First, it provides empirical evidence that positions Christmas domestic tourism as a multidimensional development strategy aligned with sustainability principles. Second, it expands the sustainable tourism literature by integrating festive events as strategic territorial resources, particularly from a Latin American context that remains underrepresented in global tourism research. Third, the study highlights the transversal

role of technology as an enabling factor for sustainable, inclusive, and data-driven tourism governance. Collectively, these contributions demonstrate that Christmas tourism can support progress toward multiple Sustainable Development Goals (SDGs 3, 8, 11, 12, and 13) by reframing celebrations through territorial, technological, and participatory perspectives.

6.1 Limitations

Despite the relevance of the findings, several limitations should be acknowledged. First, the study focuses exclusively on two Chilean cities, which limits the generalizability of the results to other national or international contexts. Second, due to the qualitative nature of the methodology, the economic, social, and environmental impacts were not directly quantified, highlighting the need for complementary mixed-methods or quantitative approaches. Finally, the analysis was limited to a single festive period (Christmas), without considering seasonal variations or other types of cultural celebrations that may exhibit different dynamics.

6.2 Implications

The implications of this research extend across academic, institutional, and practical domains. Academically, the study contributes to the advancement of sustainable tourism theory by incorporating technological innovation, social inclusion, and participatory governance within a grounded and context-sensitive framework. Institutionally, the findings underscore the importance of designing public policies that integrate sustainability, technology, and cultural planning in the management of domestic tourism, particularly during periods of high tourist demand. From a practical perspective, the results offer evidence-based guidance for local governments, community organizations, and private stakeholders to adopt festive event models that are more efficient, environmentally responsible, and socially inclusive.

6.3 Future Research Directions

Building on the findings and limitations of this study, several avenues for future research are identified. First, comparative studies across different cities, countries, or cultural contexts would allow for validation and refinement of the proposed model of sustainable festive tourism. Second, future research could incorporate quantitative or mixed methods approaches to measure the economic, social, and environmental impacts identified qualitatively in this study. Third, longitudinal analyses examining multiple festive seasons or different types of celebrations would provide deeper insights into temporal dynamics and long-term sustainability outcomes. Finally, further exploration of emerging technologies such as artificial intelligence, smart tourism systems, and real-time environmental monitoring could enhance understanding of how digital innovation can further strengthen sustainable tourism governance.

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