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Innovation and Sustainability in the Value Chain of the Tourism Sector in Boyacá

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Abstract

Boyacá, a department in the Colombian Andes, is recognized for its rich natural, cultural, and historical heritage, positioning it as an emerging tourism destination with strong potential for sustainable development. Its portfolio encompasses ecological, cultural, adventure, and rural modalities that contribute to local economies and community well-being. This study employs a mixed-methods design combining documentary analysis with fifty semi-structured interviews conducted across five provinces, engaging stakeholders such as hotel managers, travel agencies, restaurateurs, agroecological farmers, museum directors, café entrepreneurs, and ecotourism operators. The findings reveal that innovation, particularly through infrastructure, modernization, digital adoption, and service professionalization—is critical to strengthening competitiveness. However, persistent challenges include stakeholder fragmentation and the absence of a coordinated promotional strategy, both of which limit visibility and shared value generation. To address these challenges, the study proposes integrated innovation pathways, including thematic circuits (heritage, independence, and coffee routes), personalized tourism experiences, and the use of digital and experiential marketing tools. These approaches highlight the need for collaborative governance involving public, private, and community actors. The article contributes empirical evidence to the debate on tourism innovation and sustainability in emerging regions, underscoring Boyacá's paradox: global recognition coexists with fragmented governance. It argues that innovation-driven strategies, aligned with sustainability principles, are essential for consolidating Boyacá as a competitive and regenerative tourism destination.

Keywords: Boyacá tourism value chain; tourism innovation; sustainable tourism; stakeholder collaboration; mixed-methods research; thematic routes; destination competitiveness



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1. Introduction

Tourism is widely acknowledged as a driver of regional development, fostering economic growth, employment generation, and social inclusion worldwide [1]. International experiences highlight the importance of adopting innovative and sustainable strategies to ensure long-term competitiveness. For example, Japan's development of "smart tourism" illustrates how digitalization can offset structural gaps and improve destination management [2].

In Colombia, tourism has been identified as a strategic sector for national development. Yet persistent challenges—including infrastructure deficits, security concerns, and unequal

access to technology—have constrained its competitiveness [3]. Boyacá exemplifies this paradox: despite international recognition as South America's Leading Destination in the 2025 World Travel Awards and identification by Booking.com as one of the most welcoming regions, its tourism value chain remains fragmented, with weak stakeholder coordination and underdeveloped promotional strategies [4,5].

From an academic perspective, a significant research gap persists regarding how innovation and sustainability interact within tourism value chains in emerging destinations with dual cultural and mountainous attributes. While studies have addressed competitiveness [6], innovation [7], and sustainability [8] separately, limited empirical evidence examines their integration in regions like Boyacá [9].

Addressing this gap requires analyzing how innovation—through infrastructure modernization, digitalization, and service professionalization—can simultaneously promote sustainability by safeguarding natural and cultural resources [10]. In Boyacá, innovation must be grounded in heritage preservation, while sustainability must be achieved through innovative pathways such as digital infrastructure, thematic circuits, and community-based alliances [11].

The purpose of this study is therefore to analyze Boyacá's tourism value chain through the dual lens of innovation and sustainability, identifying structural weaknesses and opportunities for improvement. Specifically, the research seeks to: (i) evaluate the competitiveness of Boyacá's tourism offerings; (ii) assess the degree of stakeholder collaboration and promotional strategies; and (iii) propose innovation-based pathways to strengthen the department's position as a competitive and sustainable destination.

2. Literature Review

2.1. Innovation in Tourism

Innovation is a critical driver of competitiveness in the tourism sector. It encompasses product innovation (new experiences), process innovation (efficiency improvements), market innovation (targeting new segments), organizational innovation (new structures), and management innovation (enhanced governance) [7]. Research has shown that ICTs and digital tools transform tourism by enabling personalized services, enhancing destination management, and supporting the rise of "smart tourism" ecosystems [12,13]. In developing contexts, digital adoption can compensate for infrastructure deficits and expand competitiveness [14].

2.2. Tourism Value Chains and Sustainability

Porter's value chain framework [15] has been widely applied to tourism to explain how primary and support activities generate value for destinations. The World Tourism Organization highlights that coordination across the chain—attractions, accommodation, transport, and governance—is critical to competitiveness and sustainability [16]. Sustainable tourism requires a balance between economic growth, environmental conservation, and social inclusion [10]. Within this framework, rural and community-based tourism has emerged as a mechanism for integrating local actors, preserving cultural heritage, and ensuring equitable benefit distribution [11,17].

2.3. Innovation Models in Tourism

Theoretical models explain the dynamics of innovation in tourism. The linear model conceptualizes innovation as sequential [18], while the interactive model emphasizes systemic feedback loops [19]. More recent frameworks—such as open innovation [20] and the Triple Helix model [21]—underscore collaboration among universities, industry, and government. In the tourism sector, these approaches explain how knowledge transfer

and stakeholder collaboration shape competitiveness. Social innovation, increasingly relevant, refers to community-driven solutions that generate both economic and cultural value [22,23].

2.4. Research Gaps and Relevance to Boyacá

Although literature addresses innovation [7], sustainability [10], and value chains [11] separately, few studies integrate these perspectives in fragmented regional contexts. Evidence from Latin America shows that community-based innovation enhances competitiveness and inclusivity [17,23], yet the interaction of innovation and sustainability in regions with dual cultural and ecological assets remains underexplored [9]. Boyacá represents such a case: despite international recognition, its value chain suffers from fragmentation, weak digital adoption, and insufficient promotional strategies [5,24]. This gap justifies the present study's contribution to advancing both empirical and theoretical discussions.

3. Materials and Methods

3.1. Research Design

This study employed a mixed-methods approach, combining documentary analysis with semi-structured interviews to ensure methodological complementarity [25]. The design was selected to capture both structural characteristics and stakeholders' perceptions within Boyacá's tourism value chain. Mixed methods allow for triangulation, enhancing validity and depth in contexts where secondary data alone are insufficient [26].

3.2. Documentary Analysis

The documentary component included national and departmental policy documents, statistical reports, and academic studies on tourism, innovation, and sustainability. Sources such as the Ministry of Commerce, Industry and Tourism (MINCIT) policy frameworks [3], and regional development reports from RAP-E [27] were reviewed to characterize the macro-context and identify structural gaps in infrastructure, governance, and promotion.

3.3. Semi-Structured Interviews

To complement the documentary analysis, fifty semi-structured interviews were conducted with stakeholders across five provinces: Centro, Alto Ricaurte, Valderrama, Neira, and Tundama. The non-probabilistic sample included ten establishments per province, ensuring diversity in the value chain: hotels, hostels, travel agencies, restaurants, adventure centers, agroecological farms, museums, cafés, and ecotourism operators. This approach follows established practices for capturing sectoral perspectives in tourism studies [28,29].

3.4. Validation and Triangulation

The interview protocol was piloted with five operators and refined through expert peer review. Data triangulation was achieved by cross-verifying information from documents, field observations, and stakeholder testimonies [30]. This strategy reinforced robustness and alignment between methods and research objectives.

4. Results

The findings are organized into three analytical dimensions: (i) tourism competitiveness, (ii) stakeholder collaboration, and (iii) promotional strategies. Evidence was triangulated from documentary analysis, semi-structured interviews, and field observations [30].

4.1. Tourism Competitiveness

Infrastructure, service quality, and human capital emerged as decisive factors in Boyacá's competitiveness. Interviews indicated poor road conditions, insufficient lodging capacity, and a lack of professionalization in areas such as customer service and foreign languages. These results align with previous sectoral studies emphasizing structural constraints in Colombia's tourism development [31]. The key indicators are synthesized in Table 1, which summarizes interview evidence and its documentary support.

Table 1. Key Competitiveness Indicators Identified by Stakeholders.

Dimension	Evidence from Interviews (n = 50)	Supporting Documentary Data	Implications for Competitiveness
Infrastructure	64% reported poor road conditions; 52% insufficient lodging capacity	RAP-E (2025) tourism report [27]	Reduced accessibility and visitor retention
Service Quality	70% cited lack of training; 42% limited foreign language skills	MINCIT (2021) plan [3]	Professionalization needed for international standards
Digitalization	58% indicated minimal ICT use in promotion/booking	González (2020) [24]	Low visibility in global markets

Source: Authors' elaboration based on stakeholder interviews (n = 50) and secondary data (RAP-E [27]; MINCIT [3]; González [24]).

4.2. Stakeholder Collaboration

Fragmentation across the value chain was one of the most critical weaknesses. Only 28% of respondents reported participating in formal associative initiatives. This contrasts with international cases where collaborative governance enhanced competitiveness [32]. The degree of disconnection is visualized in Figure 1, which shows collaboration gaps across the destination network.

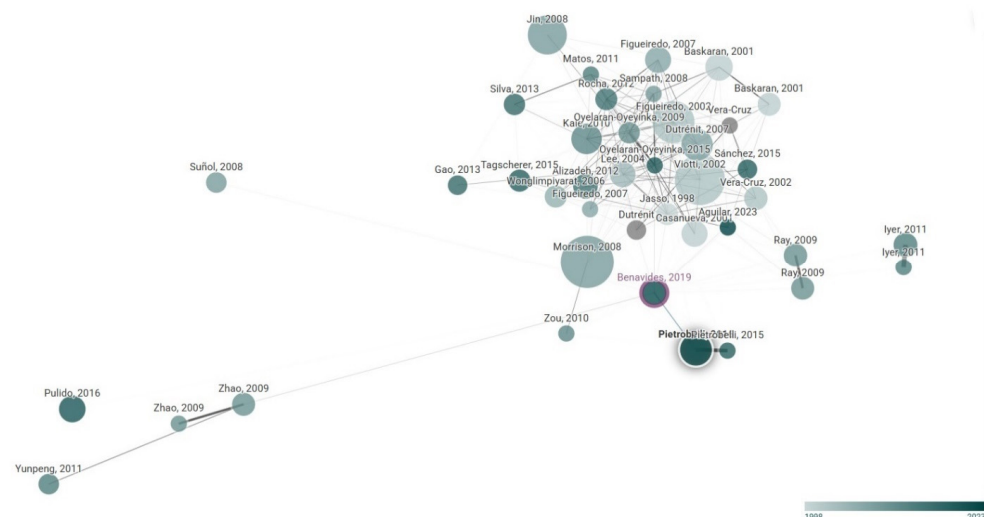


Figure 1. Stakeholder Collaboration Gaps in Boyacá's Tourism Value Chain. Author collaboration network. Source: Connected Papers (Semantic Scholar database).

4.3. Promotional Strategies

The absence of a coherent promotional strategy was consistently highlighted. Although some municipal and departmental initiatives exist, they lack coordination. Digital

promotion remains underdeveloped: only 36% of respondents reported systematic use of social media, and fewer used booking platforms [24,31]. Specific practices and limitations are detailed in Table 2.

Table 2. Promotional Practices and Limitations.

Practice	Adoption Rate (n = 50)	Limitations Identified
Social media campaigns	36%	Irregular, no unified branding
Participation in tourism fairs	22%	Limited budgets, lack of coordination
Digital booking platforms	18%	Low technological capacity of SMEs
Experiential marketing	12%	Scattered, not part of destination strategy

Source: Authors' elaboration based on semi-structured interviews (n = 50) and documentary review.

4.4. Synthesis of Findings

Overall, Boyacá's rich tourism portfolio—including cultural heritage, ecotourism, and adventure offerings—faces significant structural barriers. Weaknesses in infrastructure, human capital, collaboration, and promotion limit the region's ability to consolidate its international recognition into a sustainable competitive advantage [6]. The evidence presented in Tables 1 and 2, together with Figure 1, corroborates these gaps and underscores the urgency of innovation-driven, digitally supported strategies.

5. Discussion

The results confirm that innovation is fundamental to strengthening the competitiveness of Boyacá's tourism value chain, particularly through infrastructure modernization, digital adoption, and service professionalization. These findings align with international literature on tourism innovation [7,28], but also reveal distinctive regional challenges. Unlike destinations such as Japan and Slovenia, where smart tourism ecosystems have fostered stakeholder integration and effective branding [2], Boyacá continues to face weak collaboration and fragmented governance.

5.1. Comparison with International Experiences

International evidence demonstrates how coordinated governance and digital strategies can transform tourism competitiveness. For instance, Spain has leveraged the digital revolution to create unified branding and integrated marketing across regions [32], while Slovenia has successfully adapted diversified circuits to sustain cultural resources [2]. Japan's experience highlights the use of smart technologies to mitigate infrastructure constraints [33]. In contrast, Boyacá—despite international recognition [4]—shows low digital adoption and limited integration of thematic circuits. Latin American experiences in community-based tourism further emphasize how social innovation empowers local actors and ensures equitable distribution of benefits [11,22,23]. These contrasts underscore Boyacá's paradox: global visibility without consolidated internal coordination, reflecting the need for governance innovation as much as technological or marketing innovation.

5.2. Implementation Pathways for Stakeholders

The proposed strategies—development of thematic routes, experiential products, and digital promotion—require differentiated implementation efforts among stakeholders:

- Public authorities must lead the design of governance platforms to coordinate actors, provide infrastructure investment, and promote regulatory frameworks that support sustainability.
- Entrepreneurs should invest in training and digital platforms, strengthening service quality and visibility on global booking systems.
- Communities must be actively engaged in co-designing authentic circuits that preserve cultural identity and ecological integrity.

This multilevel collaboration reflects the logic of the Triple Helix model, emphasizing synergy between government, industry, and academia [21].

As shown in Figure 1 (Section 4.2), the current lack of connectivity between these actors justifies the need for innovation-driven governance mechanisms adapted to Boyacá's local conditions.

5.3. Implications for Competitiveness and Sustainability

Integrating innovation into Boyacá's value chain represents an opportunity to reconcile economic growth with cultural and environmental preservation. Thematic circuits—heritage, coffee, and ecotourism—can diversify the tourism offer and attract niche markets, while digital marketing and experiential promotion enhance international visibility [6,7]. These strategies correspond to the triple bottom line approach, ensuring balance between economic, social, and environmental goals [10].

Overall, the discussion emphasizes that Boyacá's paradox—global recognition coexisting with fragmented governance—requires not only technical innovations but also stronger alignment between stakeholders' roles and long-term sustainability objectives. By linking digital adoption, thematic circuits, and professional training to international benchmarks of competitiveness and sustainability [6,10,28], this study underlines the relevance of systemic approaches that integrate economic, social, and environmental dimensions. Strengthening these connections enhances the persuasiveness and coherence of the findings, showing that innovation in Boyacá is not an isolated strategy but part of a broader framework that can transform structural weaknesses into opportunities for regenerative tourism [23,34].

5.4. Limitations and Future Research

This study has certain limitations. The non-probabilistic sample of 50 establishments cannot fully capture the complexity of Boyacá's tourism sector. Interviews were conducted in five provinces, leaving out emerging municipalities with growing tourism potential. Future research should incorporate longitudinal data to assess the evolution of innovation and sustainability strategies over time. Comparative case studies across other Andean regions could further illuminate governance mechanisms in fragmented tourism systems [34]. Additionally, quantitative network analysis may provide deeper insights into collaboration dynamics and value co-creation [29].

6. Conclusions

This study demonstrates that innovation embedded in Boyacá's tourism value chain is essential to enhancing destination competitiveness. Infrastructure modernization, digital adoption, and professionalization of services emerged as decisive factors, while fragmentation and weak promotion remain structural weaknesses [24,31]. From a theoretical perspective, this research contributes to literature by integrating innovation, sustainability, and value chain frameworks, addressing a gap insufficiently explored in fragmented regional contexts [7,9,11]. The analysis highlights how innovation processes—digitalization, thematic circuits, and experiential design—can simultaneously drive competitiveness and safeguard cultural and ecological heritage [10]. Practically, the study underscores the

urgency of implementing innovation strategies adapted to Boyacá's conditions. Developing thematic routes (heritage, coffee, ecotourism), strengthening digital and experiential marketing, and investing in professional training are key measures to enhance visibility and service quality [6,7,32]. From a policy perspective, the results emphasize the need for collaborative governance platforms engaging public authorities, private entrepreneurs, and community actors. Such structures are aligned with the Triple Helix approach [21] and are necessary to transform Boyacá's international recognition into sustainable competitive advantage. In conclusion, Boyacá's paradox—global recognition amid structural fragmentation—represents both a challenge and an opportunity. By embedding innovation into sustainable pathways, the department can position itself as a living laboratory for competitive and regenerative tourism in Latin America [29,34].

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Abbreviations

The following abbreviations are used in this manuscript:

UNAD	Universidad Nacional Abierta y a Distancia
ECACEN	Escuela de Ciencias Administrativas, Contables, Económicas y de Negocios
ICTs	Information and Communication Technologies
CEI-UNAD	Comité de Ética de Investigación UNAD
CrediT	Contributor Roles Taxonomy
Q1/Q2	Quartile classification of scientific journals in Scopus database

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