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Empirical Research Article

Smart Tourism Destinations: Governance and Resilience

The Use of ICTs in Destination Governance and its Impact on Resilience

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Abstract

This study explores the nexus between governance, technology, and resilience in smart tourism destinations, elucidating how smart governance can bolster destination adaptability and resilience. Through a quantitative approach and an extensive questionnaire survey, governance and resilience dynamics, along with ICT roles, are scrutinized across Spanish tourism destinations. Results highlight the pivotal role of adaptable governance structures and strategic planning in driving successful smart initiatives. Diverse adoption patterns and varying effectiveness levels underscore the necessity for tailored approaches. By providing actionable insights, this research empowers policymakers and destination managers to enhance destination resilience and competitiveness through ICT-driven governance strategies.

Keywords

smart destinations; destination governance; destination resilience; smart initiatives

1. Introduction

The emergence of Information and Communication Technologies (ICTs) has catalyzed a profound transformation across diverse sectors, prominently influencing the landscape of the tourism industry. This paradigmatic shift has led to the development of 'Smart Tourism Destinations' (STDs), which leverage ICTs to enhance visitor experiences, optimize operational efficiency, and promote sustainable practices (Gretzel et al., 2015). The essence of STDs extends beyond technological application, representing a new paradigm in destination management and organization. Governance plays a critical role in directing the evolution of these destinations, significantly affecting their adaptability and success amidst dynamic environmental challenges (Boes et al., 2016).

However, governing STDs is inherently complex, requiring the coordination of numerous stakeholders and the integration of diverse technological frameworks (Gretzel et al., 2015). This complexity introduces various challenges, including technological issues like system integration and organizational challenges such as stakeholder alignment and policy congruence (Sigala, 2017). Understanding the determinants of smart governance and identifying effective governance models are therefore crucial for the advancement of STDs (Boes et al., 2016).

The resilience of STDs is equally crucial. These destinations must demonstrate the ability to withstand and recover from a range of crises, including natural disasters, economic downturns, and pandemics. ICTs provide a robust toolkit for crisis management, offering communication tools, coordination mechanisms, and decision-making aids. Moreover, they enhance the adaptability of STDs to global dynamics, allowing them to respond effectively to market fluctuations and environmental changes (Gretzel et al., 2015). Thus, examining the impact of smart governance on the resilience of STDs is of paramount importance. This investigation can yield valuable insights into how governance structures and practices can strengthen the resilience of STDs and guide their preparedness for future challenges (Sigala, 2017).

Despite the significant advancements in ICTs and their application in smart tourism, there is a limited understanding of how these technological advancements influence governance and resilience within tourism destinations. This study addresses the critical need to explore the relationship between smart tourism initiatives and the governance frameworks and resilience of tourism destinations. This research aims to explore transformative governance capacity, the impacts of smart governance on tourism destinations, and the relationship between governance, technology, and resilience. It seeks to understand the key elements and barriers to implementing smart governance, the effectiveness of technology in enhancing resilience and crisis management, and how governance structures interact with technological advancements. The primary research questions are: What drives the successful implementation of smart governance in tourism destinations? How effective are technology solutions in bolstering resilience and managing crises? How do governance structures interact with technology to enhance resilience?

Employing a rigorous quantitative methodology, this research examines smart initiatives implemented across 50 destinations in Spain. Given Spain's significant focus on the tourism sector and its

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commitment to advancing smart projects across various destinations, it serves as an ideal context for this study. The research aims to contribute to the existing body of knowledge on smart tourism, emphasizing the role of ICTs, and to offer practical recommendations for destination managers and policymakers.

2. Literature Review

2.1 Smart Tourism Destinations

Smart tourism destinations represent a significant paradigm shift in the tourism industry, utilizing advanced technologies to enhance visitor experiences, optimize operations, and promote sustainability. These destinations leverage ICTs to gather and analyze data, facilitating informed decision-making and tailoring experiences to individual tourists' needs (Buhalis & Amaranggana, 2015). They epitomize interconnectedness, innovation, and real-time responsiveness to tourist demands (Gretzel et al., 2015). The evolution of smart tourism is deeply intertwined with the broader smart city movement, which seeks to enhance urban living standards through technological advancements (Xiang et al., 2015). This evolution has been propelled by the proliferation of data and the widespread adoption of mobile devices among travelers, leading to the emergence of smart tourism as a strategic response to efficient destination management, sustainability, and global competitiveness (H. Zhang et al., 2022).

Smart tourism destinations are characterized by connectivity, accessibility, personalization, and sustainability. They harness the power of ICTs to cultivate seamless connectivity among diverse stakeholders, including tourists, businesses, and government agencies (Gretzel et al., 2015). Accessibility is revolutionized through real-time access to information and services via mobile platforms and applications (Gretzel et al., 2015). Personalization is facilitated by the power of data analytics, allowing destinations to tailor offerings to meet the unique needs and preferences of individual tourists (Xiang et al., 2015). Sustainability lies at the heart of smart tourism destinations, where innovative solutions driven by ICTs are employed to address pressing environmental concerns (Buhalis & Amaranggana, 2015).

The adoption of smart tourism principles yields numerous benefits, revolutionizing the way destinations cater to visitors and enhancing overall tourism experiences. Enhanced tourist experiences in smart tourism destinations go beyond mere satisfaction to encompass personalized services and seamless information delivery (Neuhofer et al., 2014). Operational efficiency in smart tourism destinations is significantly bolstered by automation and data-driven decision-making processes, resulting in substantial cost savings and optimized resource allocation (Gretzel et al., 2015).

However, challenges exist in establishing smart tourism destinations, including privacy concerns related to data collection, the digital divide due to technological access disparities, implementation costs for infrastructure and technology, and complex stakeholder management (Xiang et al., 2015; Neuhofer et al., 2014; Zhang et al., 2019).

2.2 Transformative Role of ICTs in Destination Governance

Governance in tourism is a multifaceted construct that involves various structures, processes, and relationships within the tourism ecosystem. It refers to the mechanisms through which power and responsibilities are distributed, decisions are made, and stakeholders interact in the context of tourism development (Bramwell & Lane, 2011). Effective governance mechanisms facilitate dialogue and cooperation among stakeholders, ensuring that tourism development is economically viable, socially equitable, and environmentally sustainable (Hall, 2015).

ICTs have revolutionized governance in tourism, transforming how destinations are managed and how stakeholders interact (Sigala, 2018). ICTs enable real-time data collection and analysis, providing valuable insights into tourist behavior, market trends, and environmental conditions. These insights can inform policy and strategy development, helping destinations to make informed decisions about tourism development. ICTs play a pivotal role in shaping policymaking processes within the tourism sector, offering policymakers unprecedented access to data, analytical tools, and communication platforms. By harnessing the power of ICTs, policymakers can craft more informed, targeted, and adaptive policies that enhance the resilience, sustainability, and competitiveness of tourism destinations in an increasingly dynamic and interconnected global marketplace (Buhalis & Amaranggana, 2015).

The integration of ICTs in tourism governance can significantly enhance stakeholder collaboration, fostering a more inclusive and participatory approach to destination management. Digital platforms provide avenues for stakeholders to come together, transcending geographical boundaries and organizational silos. These platforms enable the exchange of information, knowledge, and best practices, empowering stakeholders to collectively address common challenges and seize opportunities for sustainable development (Neuhofer et al., 2019; Xiang et al., 2015).

2.3 ICTs and Tourism Resilience

Resilience in tourism is a multifaceted and dynamic concept that encapsulates the capacity of destinations to navigate, absorb, adapt, and recover from various disruptions and challenges. These disruptions range from natural disasters to socio-political events (Hartman, 2016). Resilience revolves around the ability of tourism destinations to maintain their essential structure and functions amidst change, enriched by diverse perspectives, including engineering resilience and evolutionary resilience (Davoudi, 2012).

Enhancing resilience in tourism destinations demands a holistic and interdisciplinary approach that acknowledges the intricate interplay of various factors across social, economic, environmental, and institutional realms (Hall, 2015). Hartman's (2018) framework delineates six pivotal conditions for enhancing resilience within tourism destinations: diversity and redundancy, connectivity, polycentric governance systems, environmental sensitivity, learning and reflexivity, and incorporating adaptive systems thinking into destination management practices. Empirical research has identified various factors that contribute to the resilience of tourism destinations. These include a diverse range of tourism offerings, the involvement of local communities in tourism planning and decision-making, strong leadership, and strategic planning and investment in infrastructure (Ritchie, 2004).

The integration of ICTs with resilience in tourism is a critical area of study, demonstrating how technology can strengthen destinations against disruptions (Sigala, 2018). ICTs serve as catalysts for building resilient tourism infrastructure, enabling destinations to effectively navigate challenges. They facilitate real-time data analysis, establish resilient communication networks, and optimize resource management, empowering destinations to weather crises and expedite recovery processes (Sigala, 2018; Buhalis & Amaranggana, 2015). ICTs contribute to destination resilience by promoting diversity and redundancy, offering cost-effective solutions, and facilitating the provision of diverse, customized services (Fuchs & Sigala, 2021).

ICTs enhance connectivity within tourism destinations, enabling seamless communication and data exchange. They facilitate the establishment of polycentric governance systems and promote resource sharing and value co-creation. ICTs support environmental sensitivity by enabling continuous monitoring and personalized services (Katsoni & Dologlou, 2017). They foster learning and reflexivity within tourism destinations by monitoring variables and promoting a learning culture (Hendriks & Grin,

2007). ICTs transform destinations into resilient systems through adaptive systems thinking, and their integration into resilience strategies ensures destinations' adaptability and viability (Fuchs & Sigala, 2021).

ICTs contribute to the adaptive capacity of tourism destinations through real-time monitoring, resilient communication networks, and efficient resource management (Neuhofer et al., 2019). They play a crucial role in crisis management by facilitating communication and coordination during emergencies (Gretzel et al., 2015; Ritchie, 2004). Post-crisis analysis enabled by ICTs allows destinations to refine their strategies. In sustainable practices, ICTs facilitate continuous monitoring of environmental indicators, manage visitor flows, and educate tourists about responsible behavior. By harnessing technology, destinations achieve a balance between tourism development and environmental conservation (Sigala, 2018; Neuhofer et al., 2019; Ritchie, 2004).

2.4 Governance, ICTs, and Resilience Dynamics

The relationship between governance, ICTs, and resilience in tourism destinations is multifaceted and dynamic. Governance structures play an essential role in shaping the application of ICTs within tourism destinations, with involvement in areas such as policy-making, regulatory frameworks, stakeholder engagement, and crisis management (Gretzel et al., 2015; Xiang et al., 2015). Meanwhile, ICTs contribute to transforming governance processes by enabling real-time data collection, analysis, and communication, facilitating proactive strategies and interventions (Buhalis & Amaranggana, 2014).

The synergistic contributions of governance and ICTs to destination resilience are evident across various dimensions. Firstly, they foster adaptive strategies and processes, allowing destinations to adjust strategies, structures, and processes amidst disruptions and uncertainty (Davoudi, 2012). Secondly, they enhance resource management and collaboration, mobilizing resources, coordinating efforts, and optimizing resource utilization for effective response and recovery (Manyena, 2006). Lastly, they facilitate communication and consensus building, fostering constructive dialogues, disseminating information, and transcending constraints to collaboration, ultimately strengthening the resilience of tourism destinations (Folke et al., 2005).

2.5 Insights from Smart Cities

The emergence of smart cities offers valuable insights into governance and resilience strategies within the tourism sector. Smart cities utilize a fusion of smart technologies and data-driven methodologies to elevate multiple dimensions of urban living, which can be applied to enhance destination management and visitor experiences in tourism (Morrison, 2013). Governance structures in smart cities are marked by collaboration among diverse stakeholders, a characteristic that can be adopted for the sustainable development of tourism destinations (Gretzel et al., 2015). Resilience mechanisms in smart cities involve the use of smart technologies to anticipate, respond to, and recover from various types of shocks and stresses, mechanisms that can be incorporated to enhance the resilience of tourism destinations (Buhalis & Amaranggana, 2015). Sustainable development practices in smart cities entail the utilization of smart technologies to attain economic, social, and environmental sustainability, practices that can be adopted to ensure that tourism development is economically viable, socially equitable, and environmentally friendly (Buhalis & Amaranggana, 2015).

2.6. Gaps in Literature

The literature on smart tourism governance and resilience highlights several significant gaps. While acknowledging ICT's potential to enhance governance and resilience, there remains a lack of comprehensive understanding on their effective utilization in tourism. Existing studies often provide fragmented insights, overlooking holistic perspectives on smart governance and resilience synergies. Empirical research on the practical implications of smart governance, particularly during crises such as economic downturns and pandemics, is sparse. Robust theoretical frameworks for understanding the evolution of destination governance towards adaptive systems are also lacking. There is insufficient analysis of the transition from traditional governance models to dynamic systems and the factors influencing this shift. The relationship between governance, technology, and resilience in tourism destinations remains underexplored, emphasizing the need for further research in this critical area.

2.7 Contributions of This Research

This research presents a significant contribution to the burgeoning field of smart tourism, particularly focusing on governance and resilience at tourism destinations' peripheries. It offers a deep exploration of the transformative potential of governance within these contexts, especially in leveraging ICTs to bolster destination governance and resilience. The practical implications of this study are broad: for policymakers and destination managers, it provides actionable insights into adopting smart governance models to overcome barriers and enhance resilience amongst global challenges. The research aims to make theoretical contributions by identifying evolutionary patterns in destination governance and providing a clearer understanding of the transition toward fully smart adaptive systems. This quantitative research approach, integrating detailed questionnaires, yields a comprehensive dataset crucial for future endeavors in this field. By bridging theory and practice, this research delivers knowledge that can enhance the resilience and competitiveness of tourism destinations, contributing to advancing the understanding and application of smart governance in tourism.

3. Theoretical Framework

3.1 Governance, Resilience, and ICTs Use Theories

Governance in tourism destinations is shaped by several key theories. Stakeholder Theory emphasizes the importance of considering all stakeholders' interests in decision-making processes to ensure sustainable success (Freeman, 1984). Network Governance focuses on the relationships and interconnectedness among stakeholders, promoting collaborative decision-making and coordinated action (Rhodes, 1997). Institutional Theory provides insights into how formal and informal rules, norms, and shared beliefs shape governance mechanisms and stakeholders' behaviors (Scott, 2014).

Resilience in tourism destinations is underpinned by several key theories. Complex Adaptive Systems Theory views tourism destinations as self-organizing entities capable of adapting to changes and stresses, emphasizing the importance of holistic and flexible management approaches (Holling, 2001). Socio-Ecological Resilience Theory highlights the interdependence of social and ecological systems, advocating for integrated management practices that enhance both environmental sustainability and community resilience (Folke & Berkes, 1998). Disaster Resilience Theory focuses on the capacity of tourism destinations to prepare for, respond to, and recover from disasters, emphasizing the role of coordinated efforts and technological tools in improving disaster management (Paton & Johnston, 2001).

The integration of ICTs is crucial for enhancing governance and resilience in tourism destinations. Information Systems Theory underscores ICTs' role in facilitating data collection, processing, and dissemination, which are essential for informed decision-making and efficient governance (Laudon & Laudon, 2019). The Technology Acceptance Model (TAM) highlights factors influencing ICT adoption, such as perceived usefulness and ease of use, and the importance of supportive infrastructure and regulatory environments (Davis, 1989). The Diffusion of Innovations Theory explains the spread of ICTs, emphasizing the roles of communication channels, social systems, and adopter behaviors in promoting technological integration (Rogers, 2003).

3.2 Integrative Framework

Combining these theoretical perspectives provides a comprehensive framework for understanding the dynamics of smart governance and resilience in tourism destinations. Stakeholder Engagement and Collaboration are foundational to this framework, with Stakeholder Theory and Network Governance emphasizing inclusive and interconnected decision-making processes involving diverse stakeholders. Institutionalization of Smart Practices is another critical aspect, as Institutional Theory provides insights into how smart governance practices and ICTs can be embedded within regulatory frameworks, cultural norms, and shared beliefs to promote resilience and sustainability. Adaptive and Holistic Management, guided by Complex Adaptive Systems Theory and Socio-Ecological Resilience Theory, underscores the necessity for tourism destinations to continuously learn, evolve, and balance social, economic, and environmental dimensions. Disaster Preparedness and Resilience, informed by Disaster Resilience Theory, highlights the crucial role of ICTs and governance in enhancing preparedness, response, and recovery from disasters. Building resilient infrastructure and fostering a culture of preparedness are essential components of this framework. The integration of Information Systems Theory, the Technology Acceptance Model (TAM), and the Diffusion of Innovations Theory further strengthens the framework by emphasizing the role of ICTs in facilitating data-driven decision-making, fostering stakeholder engagement, and promoting the adoption of innovative practices.

Applying this integrative framework to smart tourism destinations involves several strategic actions. Leveraging ICTs for Data-Driven Decision-Making is crucial; by gathering, processing, and analyzing data, destinations can make informed decisions that enhance resilience and sustainability. Fostering Stakeholder Collaboration through digital platforms and networks ensures seamless communication and coordinated efforts among tourists, businesses, local communities, and government bodies. Institutionalizing Sustainable Practices requires the promotion and adoption of smart governance principles within regulatory frameworks and cultural norms, ensuring these practices become ingrained in the operational fabric of the destination. Enhancing Adaptive Capacity involves implementing adaptive management strategies that enable destinations to effectively respond to dynamic changes and disruptions, ensuring a balanced development across social, economic, and environmental dimensions. Finally, Building Disaster-Resilient Infrastructure and systems is essential for preparing for, responding to, and recovering from potential disruptions. ICTs play a pivotal role in this aspect, enhancing emergency communication and coordination.

3.3 Hypothesis Development

Based on the theoretical framework, hypotheses can be developed to guide research. Hypothesis 1: The integration of ICTs in tourism governance enhances stakeholder collaboration and decision-making processes. Hypothesis 2: ICTs contribute to the resilience of tourism destinations by facilitating data analysis and adaptive management practices. Hypothesis 3: Effective governance structures positively influence the adoption of smart tourism initiatives. Hypothesis 4: The use of ICTs in disaster management improves the preparedness and response capabilities of tourism destinations. Hypothesis 5: Smart tourism practices lead to improved operational efficiency and resilience.

4. Methodology

The methodology adopted for this research employs a quantitative approach to comprehensively assess smart tourism initiatives and technological solutions within tourism destinations. This approach is chosen for its ability to provide structured and measurable insights into the implementation, impact, and effectiveness of smart tourism strategies, as well as the role of ICTs in governance and destination resilience. By utilizing quantitative methods, the study aims to systematically analyze a diverse range of variables across multiple destinations, allowing for a nuanced understanding of the complex interplay between smart tourism initiatives and destination dynamics. The target audience for the questionnaire was tourism destinations in Spain. Focusing on Spain as the research context offers a unique opportunity to examine a country with a rich and diverse tourism landscape, encompassing coastal, urban, and rural destinations. This choice enables the study to draw upon Spain's extensive experience in tourism governance and innovation, providing valuable insights that can inform both local and global tourism practices. Through this methodological approach, the research seeks to contribute to the advancement of knowledge in smart tourism governance and resilience, while also offering practical implications for stakeholders involved in tourism management and policymaking.

4.1 Data Collection

The data collection process for assessing smart tourism initiatives and technological solutions in destinations comprises several key components. Firstly, the design of the questionnaire was meticulously structured to provide a comprehensive evaluation of these initiatives, covering aspects such as implementation, impact, and prospects. Divided into four sections, it gathers fundamental information about destinations and organizations involved, explores the effectiveness of ICTs in governance domains, assesses perceptions of technological solutions, and evaluates the impact of ICTs on destination resilience.

Survey Design. The survey design was informed by an extensive review of existing literature and established theoretical frameworks in smart tourism and ICT governance. The questionnaire includes various question types, such as closed-ended, open-ended, Likert scale, multiple-choice, and evaluation prompts, enabling a thorough examination of stakeholders' perspectives and experiences. Each question was carefully crafted to align with the study's hypotheses and objectives.

4.1.1 Section 1: Fundamental Information

This section collects basic information about the destinations and the organizations involved in smart tourism initiatives. Questions were designed to gather data on the scale and budget of the organizations, and their strategic development documents, following the guidelines of similar studies in tourism research (Buhalis & Amaranggana, 2014).

4.1.2. Section 2: Effectiveness of ICTs in Governance

This section assesses how ICTs contribute to efficiency, stakeholder coordination, public service delivery, and collaboration among local departments. The questions were

derived from frameworks proposed by Sigala and Marinidis (2012) and explored challenges such as resource constraints and the efficacy of technology.

4.1.3. Section 3: Impact of ICTs on Destination Resilience

This section evaluates the role of ICTs in recognizing tourist systems, adapting responses to competitiveness problems, and strengthening institutional capacity. Questions in this section were based on studies by Gretzel et al. (2015) and aimed to explore perceptions of specific technologies contributing to destination resilience and difficulties in implementing technological solutions.

4.1.4. Section 4: Satisfaction and Future Impact

Respondents evaluate their satisfaction levels with current smart projects and perceived future changes brought by these initiatives. The questions were designed to capture qualitative insights into the success and anticipated impacts of smart tourism projects.

4.1.5. Questionnaire Validation and Quality Control

The questionnaire underwent a meticulous validation process to safeguard its reliability and validity. Initially, a pilot test engaged a select group of tourism professionals, refining questions for clarity. Feedback from this pilot phase prompted minor adjustments in wording and structure. To bolster its credibility, the questionnaire underwent scrutiny by a panel of experts specializing in smart tourism and ICT governance. Their invaluable insights fine-tuned the instrument, ensuring it accurately captured intended variables and aligned with theoretical frameworks. During data collection, stringent quality control measures were enforced to uphold data accuracy and reliability. The questionnaire was electronically disseminated to authorized governing bodies in each destination, with subsequent reminders to encourage participation. Response monitoring ensured completeness and consistency, swiftly addressing any discrepancies. Employing a purposive sampling strategy, all tourism destinations in Spain were targeted to ensure a diverse dataset. Distribution commenced in February 2023, with responses solicited until reaching a minimum threshold of 50 valid respondents, ensuring robust reliability and validity.

4.2 Data Analysis

The data analysis phase involved several key steps. Initially, questionnaire responses were meticulously organized to construct a valid dataset, ensuring data accuracy and completeness. Subsequently, descriptive analysis provided insights into destination characteristics and capacities and their smart initiative implementation, highlighting the utilization, effectiveness, and challenges of ICT applications across various domains within destinations. Following this, the dataset underwent preparation for statistical analysis, which involved selecting the appropriate variables and numerating answers. Likert scale answers were given scores from 1 for minimum compliance with the variable to 5 for maximum compliance, while binary questions, such as the existence of a dedicated office for the smart project, were given 1 for existence and 0 for absence of such an office.

In addressing the challenge of handling high-dimensional data, factor analysis was implemented through R software to achieve dimensionality reduction. The original dataset, consisting of numerous variables, was categorized into nine distinct groups, each representing variables that share common underlying traits. Factor analysis was then applied to uncover latent factors, condensing the data's dimensionality from numerous variables to nine primary dimensions: (1) Smart Project Implementation, (2) ICT Application Spectrum, (3) ICTs Effectiveness Across Various Areas, (4) ICTs Effectiveness in Governance Areas, (5) Challenges in Implementing ICTs for Governance, (6) ICTs Effectiveness in Resilience Areas, (7) Leveraging ICTs for Resilience, (8) Challenges in Leveraging ICTs for Resilience, and (9) Smart Project Satisfaction and Future Impact. This process facilitated more efficient and interpretable analyses by replacing each variable group with its extracted factor while preserving essential information.

Based on factor analysis results, a clustering analysis was conducted to categorize tourism destinations, resulting in three distinct clusters. This approach provided insights into the varied trajectories and challenges encountered by destinations as they utilize ICTs in governance and for building resilience. A comparative analysis between the three clusters across the nine dimensions was then performed to further explore the nuanced characteristics of each cluster.

By implementing the adopted methodology and meticulously gathering and analyzing data, the study unveiled invaluable insights into the implementation, impact, and effectiveness of smart tourism strategies, alongside the essential role of ICTs in governance and destination resilience. This comprehensive scrutiny of the data empowered the study to draw evidence-based conclusions, thereby enriching the understanding of smart tourism governance and resilience and advancing knowledge in the field.

5. Findings

5.1 Destinations Diversity

The geographical breakdown of questionnaire responses offers a comprehensive overview of tourism destinations across mainland Spain, including Catalonia and the Canary Islands, predominantly clustered along the Mediterranean coast and extending to regions bordering the Atlantic Ocean. This distribution aligns with established patterns of tourist activity, ensuring the sample's representativeness for deriving valid insights. The inclusion of destinations spanning coastal, inland, urban, and rural settings underscores the multifaceted nature of tourism governance, necessitating tailored strategies for the effective implementation of smart tourism initiatives. The analysis examined the accommodation capacity, revealing a diverse landscape ranging from smaller-scale accommodations in niche markets to larger-scale establishments in popular destinations, highlighting the nuanced governance and resilience strategies required. Examining threats and competitive problems faced by destinations reveals economic and climate crises as high-occurrence threats alongside intense competition, while moderate and low-occurrence threats encompass product differentiation challenges, seasonality issues, and budget limitations. This multifaceted picture underscores the need for proactive management strategies to foster sustainable development. Profiling the entities responding to the questionnaire illustrates a diverse array of administrative bodies responsible for tourism development, showcasing varied governance structures and policies across destinations, with collaborative efforts evident in associations and foundations. Analysis of annual budgets and employee numbers provides insights into the financial and operational capacities of respondent entities, reflecting the varying scales of tourism administration and offering valuable insights into resources available for implementing smart tourism projects and fostering destination resilience.

5.2 Adaption and Development of Smart Initiatives

The questionnaire offers a detailed overview of the adoption of smart initiatives in various tourism destinations, revealing that

most destinations lack dedicated offices for smart projects (30 out of 50), while 17 have established such offices. When examining the linkage of smart tourism projects to strategic plans, it is found that 22 projects are linked to tourism development plans, but 8 are not linked to any global destination planning. While 18 destinations have adopted separate ICT solutions, 15 have embraced complete smart projects with established objectives, indicating a preference for comprehensive solutions. The adoption timeline indicates a recent surge in smart project adoption, with 28 destinations implementing them less than 5 years ago. Most projects (29 out of 50) are in the initial stage of development, underscoring the need for strategic planning and dedicated offices to ensure successful implementation. This data reflects a growing trend toward the adoption of smart initiatives in tourism destinations, emphasizing the importance of comprehensive planning and strategic integration for effective outcomes.

5.3. Implementing Smart Initiatives

In assessing the importance of various elements when employing technology to tackle specific issues at tourism destinations, perceptions vary across different domains. While enhancing the quality of service at the destination and improving destination competitiveness are widely regarded as crucial, there's also a strong emphasis on following global digitalization trends and enhancing destination resilience and adaptive capacity. Improving the destination economy and governance are seen as vital factors, indicating a multifaceted approach to technology integration. Aspects like enhancing destination social impacts and environmental impacts are also considered significant, highlighting the broader societal and environmental considerations within destination management. These findings underscore the complexity of utilizing technology to address diverse challenges and opportunities within tourism destinations, emphasizing the need for comprehensive strategies to maximize its impact effectively.

The evaluation of the effectiveness of technological solutions within tourism destinations (Table 1) reveals varied perceptions across different areas of application. While governance and environmental management receive mixed reviews, with some respondents acknowledging their efficiency and others indicating room for improvement or no utilization, marketing emerges as a domain where technological solutions are widely perceived as highly effective. Similarly, the quality of service is generally regarded favorably, albeit with some uncertainties and areas lacking technological intervention. Opinions on the efficiency of technological solutions in addressing economic challenges are more diverse, suggesting potential untapped opportunities for technology-driven economic development. Furthermore, while safety, security, and destination resilience are recognized as areas where technology can significantly contribute, gaps in technology adoption in these domains indicate areas for improvement. These insights underscore the importance of continuous evaluation and enhancement of technological solutions to optimize their impact across various aspects of tourism destination management.

Table 1. Perceived Efficiency of Technological Solutions Across Destination Domains

	The area of application	Evaluation						
		5	**4**	**3**	**2**	**1**	**NO**	**NA**
1.	Governance	11	9	10	6		9	5
2.	Environment	9	11	13	5	1	8	3
3.	Marketing	19	7	11	4	1	4	4
4.	Quality of service	17	7	16	1	1	3	5
5.	Economy	8	9	12	5	1	7	8
6.	Safety and Security	11	10	12	3		8	6
7.	Quality of life	12	8	16	2		6	6
8.	Destination Resilience	11	7	12	4	1	8	7

Note: 1, Very poor; 2, Under average; 3, Average; 4, Above average; 5, Very good; NO, No technological solutions; NA, No answer.

5.4 Assessment of ICTs Effectiveness in Governance Areas

The evaluation of ICT effectiveness in governance areas within tourism destinations (Table 2) reveals diverse perceptions among respondents. While there's generally positive feedback on efficiency and effectiveness, respondents express mixed views on building networks, stakeholder coordination, and public service delivery. Challenges emerge regarding reducing public spending, policy monitoring, and fostering public-private partnerships, indicating potential limitations in leveraging ICTs for these purposes. Respondents acknowledge the importance of knowledge and training in utilizing technology for governance but remain divided on the effectiveness of technology in solving governance problems compared to alternative approaches. Concerns regarding resource constraints, including technological, economic, and human resources, underscore the complexities in implementing technology solutions for governance. These insights emphasize the need for nuanced strategies and investments to address challenges and optimize the effectiveness of ICTs in governance practices within tourism destinations.

Table 2. Perceptions of ICTs effectiveness in governance areas.

	Areas of governance	Evaluation					
		5	**4**	**3**	**2**	**1**	**NA**
1.	Efficiency and efficacy	12	19	9	1	1	8
2.	Ability to build networks	17	16	6	4	7	
3.	Stakeholders' coordination at different levels or scales	13	13	11	5	1	7

4.	Public services aimed at citizens	16	19	10	1	4	
5.	Local departments collaboration	14	18	9	2	7	
6.	Local conflicts resolution	10	16	11	4	2	7
7.	Reduce public spending	7	17	11	2	2	11
8.	Monitoring public policies	6	17	12	3	1	11
9.	Foster public-private partnerships	13	13	11	4	2	7
10.	Simplicity and reduction in regulations	8	13	11	4	2	12
11.	Know-how and training	13	16	11	2	1	7
12.	Coherence in planning	13	15	12	2	1	7
13.	Management openness	11	18	13		1	7
14.	Transparency	20	15	8	1	6	
15.	Cooperation with stakeholders	16	13	12	2	1	6
16.	Community participation	11	18	9	3	3	6

Note: 1, Very poor; 2, Under average; 3, Average; 4, Above average; 5, Very good; NO, No technological solutions; NA, No answer.

5.5 Assessment of ICTS Effectiveness in Destination Resilience

The effectiveness of ICTs in enhancing destination resilience within tourism is multifaceted, with perceptions generally positive across various dimensions. As shown in Table 3, ICTs are widely acknowledged for their role in recognizing complex tourism systems, measuring evolution and change, and enabling adaptive responses to competitiveness challenges. However, there are nuanced differences in opinions, particularly concerning community-based tourism, institutional capacity strengthening, and investment control for infrastructure development, suggesting varying levels of confidence or understanding in these areas. Despite these variations, ICTs are recognized as valuable tools for enhancing resilience, with their ability to sense conditions, facilitate sharing, and foster innovation contributing to destination adaptability and robustness. Nonetheless, challenges persist in the implementation of technological solutions, notably due to resource constraints and knowledge gaps, underscoring the need for further research and capacity-building efforts to maximize the potential of ICTs in bolstering resilience within tourism destinations.

Table 3. Effectiveness of ICTs in key areas of destination resilience.

	Area of Assessment	**Agreement or Disagreement**					
		5	**4**	**3**	**2**	**1**	**NA**
1.	Recognize and identify tourism complex systems	18	20	6			6
2.	Better measure evolution and change	21	21	2			6
3.	Adaptive response to other competitiveness problems	16	25	4			5
4.	Building community-based tourism	14	15	14			7
5.	Strengthen the institutional capacity to control infrastructure development.	14	21	6	1	1	7
6.	Strengthen investment to control infrastructure development.	11	19	11	1		8
7.	Improving the diversity of tourism destination supply products.	24	17	3			6
8.	Improving the knowledge and skills of tourism practitioners in the destination	25	17	3			5
9.	Monitoring tourism destinations more comprehensively	28	16	1			5
10.	Building destination robustness (connectivity, demand/capacity, efficiency)	21	20	3			6
11.	Building destination redundancy (variety and availability of alternatives)	19	18	3	1		9
12.	Building destination resourcefulness (availability of resources and people and their readiness)	13	23	7			7
13.	Building destination rapidity (time required to restore normal operation)	14	17	8	1		10

Note: 1, strongly disagree; 2, disagree; 3, neither agree nor disagree; 4, agree; 5, highly agree; NA, no answer.

5.6 Satisfaction and Future Impact

The evaluation of general satisfaction with smart projects across diverse destinations highlights a predominantly positive reception, with 20 respondents expressing satisfaction and 4 reporting high satisfaction levels, while 17 respondents conveyed neither dissatisfaction nor satisfaction, indicating uncertainty. Only four respondents expressed dissatisfaction, suggesting areas for improvement. Expectations regarding the transformative impact of smart projects over the next 5- 10 years are generally optimistic, with 23 respondents agreeing and 17 highly agreeing with the proposition. However, some respondents remain neutral or uncertain. The critical discourse analysis reveals a spectrum of satisfaction levels, with some stakeholders expressing high satisfaction due to perceived differentiation and rapid progress, while others express dissatisfaction stemming from resource limitations and a lack of capacity. A neutral group expresses cautious optimism, highlighting concerns about resources and

capacity. The themes emerging from the discourse include the perceived potential for change, implementation challenges, and varying resource levels. The analysis underscores the need for a nuanced approach to implementation and management, emphasizing ongoing engagement to ensure successful and equitable project execution.

5.7 Clustering Analysis for Destinations

The dataset was condensed into nine main dimensions through factor analysis, offering a comprehensive framework for exploring various facets of tourist destinations and facilitating a deeper understanding of technology acceptance within tourism contexts. The utilization of R software and integrated clustering algorithms enabled the discovery of hidden patterns, leading to the formation of coherent clusters based on shared characteristics among destinations. These clusters depicted distinct profiles of technology acceptance and implementation of smart projects. As shown in Table 4, the K-means clustering analysis illustrates three distinct clusters derived from the dataset. The analysis yielded an R^2 value of 0.362, with an AIC score of 335.23, a BIC score of 386.86, and an overall Silhouette score of 0.18. These metrics collectively provide a positive outlook and insight into the quality and structure of the clustering. Cluster 1 comprises 11 destinations, with an explained proportion within-cluster heterogeneity of 0.218 and a within-sum of squares of 61.317, yielding a Silhouette score of 0.161. Cluster 2 encompasses 19 destinations, demonstrating an explained proportion within-cluster heterogeneity of 0.36, a within-sum of squares of 101.346, and a Silhouette score of 0.191. Meanwhile, Cluster 3 consists of 20 destinations, with an explained proportion within-cluster heterogeneity of 0.422 and a within-sum of squares of 118.569, achieving a Silhouette score of 0.187. Table 4 also presents center values for factors, offering average insights into these factors across each cluster. This detailed breakdown facilitates a comprehensive understanding of the distinctive characteristics defining each cluster within the dataset.

Table 4. K-Means clustering.

Clusters	N	R^2	AIC	BIC	Silhouette
3	50	0.362	335.230	386.860	0.180

Cluster	1	2	3
Size	11	19	20
Explained proportion within-cluster heterogeneity	0.218	0.360	0.422
Within the sum of squares	61.317	101.346	118.569
Silhouette score	0.161	0.191	0.187
Center Smart Project Implementation	-0.102	0.781	-0.686
Center ICTs Application Spectrum	0.331	0.438	-0.598
Center ICTs Effectiveness Across Various Areas	0.818	0.104	-0.549
Center ICTs Effectiveness in Governance	0.902	0.020	-0.515
Center Challenges in Implementing ICTs for Governance	1.147	-0.742	0.075
Center ICTs Effectiveness for Resilience	0.799	-0.048	-0.394
Center Leveraging ICTs for Building Resilience	0.610	0.487	-0.798
Center Challenges in Leveraging ICTs for Resilience	0.970	-0.770	0.199
Center Smart Project Satisfaction and Future Impact	0.030	0.723	-0.703

5.8 Comparative Analysis Between the Clusters

Figure 1 provides comparison between the three clusters of tourism destinations based on their scores in each dimension. Through this comprehensive comparison, the three clusters can be distinguished and characterized as follows:

5.8.1 Cluster 1: High Smart Project Implementation and Governance Effectiveness

This cluster exhibits relatively high scores across several dimensions, particularly in terms of ICT application spectrum and effectiveness across various areas. Destinations in this cluster have successfully implemented smart projects and effectively utilized ICTs to enhance governance. They demonstrate a strong capability in leveraging ICTs for building resilience, indicating a proactive approach to managing challenges. These destinations express high satisfaction with smart project implementation and anticipate positive future impacts.

5.8.2 Cluster 2: Moderate Smart Project Implementation

Destinations in this cluster display moderate scores across most dimensions, with a notable strength in smart project implementation. However, there are challenges evident in leveraging ICTs for governance and resilience-building. Despite relatively high satisfaction levels and anticipated future impacts of smart projects, effectiveness in governance and resilience-building is hindered by various obstacles.

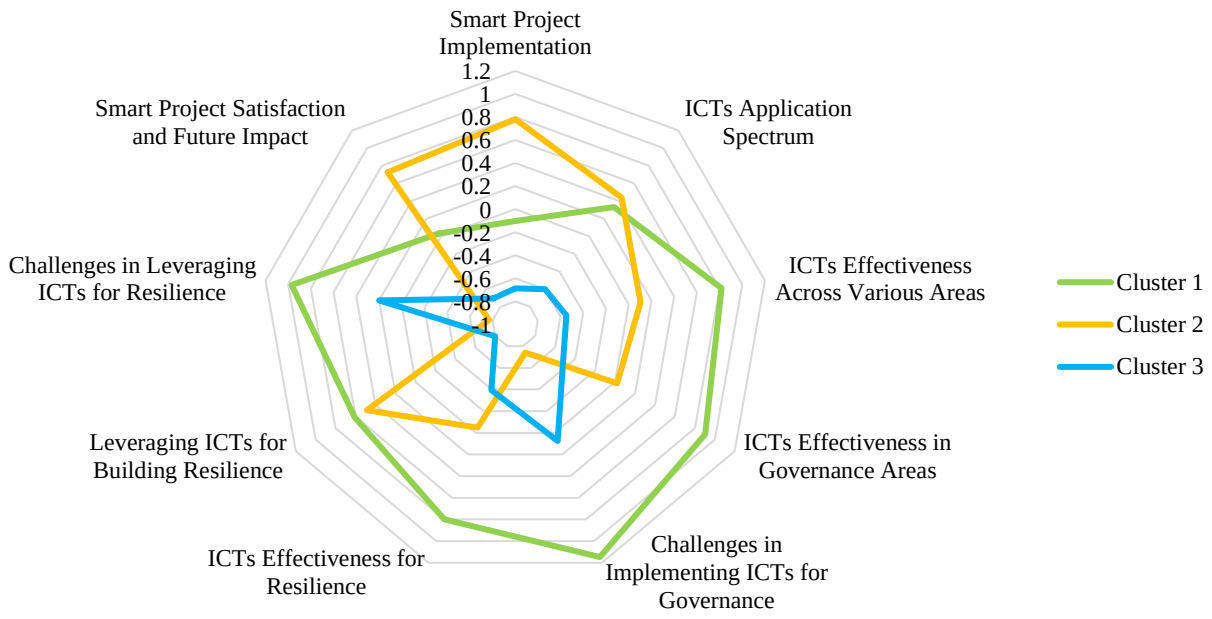

Figure 1. Comparative analysis of the three clusters

Cluster 3: Low Smart Project Implementation

This cluster represents destinations with comparatively lower scores across all dimensions, indicating limited implementation of smart projects and ineffective utilization of ICTs. Governance effectiveness and resilience-building efforts are particularly weak in these destinations. Challenges in implementing ICTs for governance and leveraging them for resilience further exacerbate the situation. These destinations express lower satisfaction levels with existing smart projects and foresee limited positive future impacts.

6. Discussion

The exploration of governance and resilience dynamics within tourism destinations provides a multifaceted understanding of the transformative potential of smart initiatives. Each destination exhibits a rich diversity, presenting a unique array of challenges and opportunities shaped by factors including tourist activity patterns, infrastructure development, and socio-economic conditions. This diversity underscores the imperative for adaptable governance frameworks capable of addressing the nuanced requirements of individual destinations. Tailoring smart initiatives to address specific challenges, such as enhancing tourist experiences, optimizing resource utilization, and fostering community engagement, is essential for effective destination management and sustainable development.

The analysis of project adoption reveals a spectrum of approaches employed by destinations in integrating smart initiatives. Some destinations have established dedicated offices to oversee smart projects, while others have integrated initiatives within existing governance structures. The effectiveness of project implementation varies across destinations, influenced by factors such as resource availability, stakeholder collaboration, and technological infrastructure. Strategic planning and stakeholder engagement emerge as critical factors in guaranteeing the successful execution of smart initiatives.

The evaluation of smart initiatives indicates varying perceptions of their effectiveness across different destination domains. Domains like marketing and quality of service receive favorable reviews, while governance and environmental management exhibit mixed responses. This underscores the complexity of leveraging technology to address diverse challenges within tourism destinations and highlights the need for continuous evaluation and adaptation of smart initiatives to optimize their impact on destination governance and resilience.

The analysis of governance and resilience strategies within tourism destinations highlights the importance of adaptive governance frameworks. Destinations must navigate a complex landscape characterized by economic uncertainties, environmental vulnerabilities, and socio-political dynamics. Smart governance approaches, informed by data-driven decision-making and stakeholder collaboration, can enhance destination resilience and competitiveness. Strategies for building resilience, such as diversifying tourism products, strengthening community engagement, and investing in infrastructure, are crucial for mitigating risks and seizing opportunities.

The evaluation of satisfaction levels with smart projects underscores the importance of stakeholder engagement and communication. While some stakeholders express satisfaction with the progress and differentiation achieved through smart initiatives, others highlight concerns about resource constraints and capacity limitations. Optimistic expectations regarding the future impact of smart projects signal a shared belief in their transformative potential. However, cautionary voices emphasize the need for ongoing monitoring and adaptation to ensure sustained success.

The clustering analysis offers valuable insights into the diverse trajectories of technology acceptance and smart project implementation across tourism destinations. By identifying cohesive clusters based on shared characteristics, such as technology adoption levels and project effectiveness, the analysis provides a framework for understanding the heterogeneity within destination governance landscapes. This grouping facilitates targeted interventions and knowledge sharing, enabling

destinations to learn from each other's experiences and best practices.

The outcomes of this research correspond with the extensive body of literature concerning smart tourism and destination governance. The examination of governance and resilience dynamics within tourism destinations aligns with Hartman's (2023) assertion regarding the necessity of adaptable governance frameworks in destination development. Similarly, the scrutiny of the varied challenges and opportunities inherent in each locale resonates with the inquiry conducted by George et al. (2024) regarding the transformative potential of smart governance in tourism destinations. The study's emphasis on tailoring smart initiatives to address specific challenges reflects the methodology advocated by Shafiee et al. (2022), who devised a model for smart tourism destinations utilizing an interpretive structural modeling approach. Furthermore, the assessment of satisfaction levels with smart projects underscores the significance of stakeholder engagement and communication, a thematic element also highlighted by Y. Zhang et al. (2022) in their examination of the impact of smart technologies on the tourism experience.

7. Conclusion

This study explores the intricate dynamics of governance, resilience, and the role of ICTs within tourism destinations, shedding light on their transformative potential for sustainable development. Through an examination of various tourism destinations, specifically focusing on smart initiatives in Spain, the research underscores the significance of adaptable governance structures and strategic stakeholder engagement in navigating the complexities of tourism management. The findings highlight diverse challenges and opportunities inherent in different destinations, stressing the importance of tailored smart initiatives to effectively address specific contexts. By integrating ICTs into governance frameworks and harnessing their capabilities in data-driven decision-making and disaster management, destinations can bolster their resilience and competitiveness in a rapidly evolving global landscape. While offering valuable insights and implications for policymakers and destination managers, the study acknowledges limitations such as sample size and methodological constraints that warrant careful consideration. Future research could include qualitative methods, longitudinal studies, and emerging technologies to enhance understanding and practical applications in optimizing tourism governance and resilience.

Declaration of competing interests

The authors declare no competing interests.

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