

Collaborative Models in the Smart Tourism Supply Chain: Analysis and Implications

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Abstract: This paper investigates the development and collaborative models within the smart tourism supply chain, focusing on Online Travel Agencies (OTAs), scenic spots, and the roles of core stakeholders in facilitating smart tourism. It highlights the status of smart tourism development, particularly in the context of Jiangxi Province, and explores the evolution of OTAs and scenic spots towards smart tourism amidst the challenges posed by the pandemic. Three main collaboration models are identified: the independent development model, the regional smart tourism supply chain collaboration model, and the holistic smart tourism supply chain collaboration model, each with distinct characteristics and implications for stakeholders. By analyzing these models, the paper identifies existing issues within the smart tourism supply chain, including the need for better integration of smaller scenic spots and the pivotal role of tourism management institutions in fostering a more inclusive and sustainable smart tourism ecosystem. The findings suggest pathways for enhancing collaboration and sustainability in the smart tourism supply chain, emphasizing the importance of strategic partnerships and policy support.

Keywords: Smart Tourism, Supply Chain, Online Travel Agencies (OTAs), Scenic Spots, Collaboration Models

1. Introduction

The concept of smart tourism has emerged as a transformative force within the tourism industry, leveraging technology to enhance the tourist experience, operational efficiency, and economic sustainability. This evolution towards smart tourism has been accelerated by technological advancements and changing consumer behaviors, especially in the context of the post-pandemic recovery phase. Smart tourism represents a holistic approach that integrates information and communication technology (ICT) throughout the tourism experience, from planning and booking through travel and post-travel phases. However, the effective implementation of smart tourism initiatives necessitates a robust collaboration among various stakeholders within the tourism supply chain, including Online Travel Agencies (OTAs), scenic spots, and tourism management institutions. This paper delves into the current state of smart tourism development, with a special focus on the collaborative construction within the smart tourism supply chain [1]. By examining the development status of OTAs and scenic spots and exploring various collaborative models, this study seeks to uncover the underlying issues that hinder the seamless integration of smart tourism practices. Jiangxi Province in China is presented as a case study to illustrate the practical aspects of smart tourism

development and supply chain collaboration. Through this analysis, the paper aims to provide insights into the dynamics of smart tourism collaboration, highlighting the critical role of technology, policy, and strategic partnerships in overcoming challenges and leveraging opportunities within the smart tourism supply chain.

2. Current State and Issues of Collaborative Smart Tourism Supply Chain

As an emerging and rapidly developing tourism model, smart tourism requires a thorough understanding of its existing issues. This chapter firstly introduces the status of collaborative construction in smart tourism; secondly, it discusses the current development of smart tourism nodes; then, it explores the collaborative models within the smart tourism supply chain and analyzes the core stakeholders involved in this collaboration. Finally, based on the analysis above, the chapter identifies the problems existing in the smart tourism supply chain [2].

2.1. Development Status of Smart Tourism

2.1.1. Current Development of Smart Tourism

Smart tourism is becoming a significant engine driving the development of the tourism industry, with its construction and development increasingly receiving national attention.

Driven by various factors, the development of smart tourism is gradually overcoming the impacts of the pandemic and returning to its normal track. According to statistics from the China Research Institute for Industry, the market size of China's smart tourism industry was 435.5 billion yuan in 2019. However, due to the pandemic, it rapidly fell by 30.5% compared to 2019 [3]. In 2021, as the impact of the pandemic diminished, the market size of the entire smart tourism industry rebounded to 448 billion yuan, returning to its pre-pandemic level. Additionally, the proportion of travelers using OTA (Online Travel Agency) has also occupied a significant part. According to data from the China Internet Network Information Center (CNNIC), in December 2020, the number of travelers who booked via OTA platforms reached 342.44 million, accounting for 34.6% of the total netizens. This indicates that many travelers now consider using OTAs when traveling.

2.1.2. Provincial Smart Tourism Construction Status

To more intuitively explore the current status of smart tourism supply chain development domestically, this text analyzes the construction status of smart tourism in Jiangxi Province as an example. As a province in the mid-range of the national economy but in the upper range for tourism, Jiangxi Province ranked first in GDP growth rate nationwide in 2020, making its smart tourism construction status somewhat representative and extendable [4].

Due to the terrain of Jiangxi Province being primarily hills and mountains, especially in the southern Gan area, only the area near Jiujiang and Nanchang in northern Gan has large plains of Poyang Lake, resulting in the province's overall terrain being mountains surrounded by a small plain. This terrain also gives Jiangxi more natural scenic resources compared to other central provinces, hence, the number of scenic spots in its cities has a competitive advantage over those in other central provinces.

2.2. Current Status of Smart Tourism Supply Chain Nodes

The smart tourism supply chain comprises numerous nodes. Among these, OTAs and scenic spots, as the direct service providers to tourists, play a crucial role in the intelligence level of the entire supply chain. Therefore, this section will primarily introduce the current state of smart development for both entities.

2.2.1. OTA Development Status

In the evolving landscape of smart tourism, Online Travel Agencies (OTAs) have emerged as pivotal players, significantly influencing the ways in which tourism destinations, particularly scenic spots, integrate technology to enhance the visitor experience. These digital platforms have systematically addressed numerous challenges inherent to traditional tourism practices, thereby facilitating a more streamlined and efficient approach to travel planning and execution [5]. The Forward Industry Research Institute's findings, as of 2021, offer a comprehensive classification of OTAs into three distinct tiers based on their market influence, technological adoption, and service offerings. This tiered structure provides a nuanced understanding of the competitive dynamics within the OTA sector and its impact on smart tourism development. The foremost tier, comprising Ctrip, Fliggy, and Qunar, represents the leading edge of OTA innovation and market penetration. Ctrip, in particular, exemplifies the strategic consolidation efforts prevalent within this tier, as evidenced by its acquisition of Qunar in 2015. This strategic move not only augmented Ctrip's service portfolio but also significantly expanded its market share, reinforcing its dominant position within the OTA landscape. Such consolidations within the first tier underscore the aggressive competition and the continuous pursuit of technological and strategic advantages to cater to the evolving demands of smart tourism.

The second tier includes Tongcheng Travel, Meituan, Tuniu, and Lvmama, which, while influential, operate with a slightly different market focus or technological emphasis compared to the first tier. This tier's diversity in service offerings and strategic focus points to a broader spectrum of smart tourism needs being addressed, from niche travel experiences to integrated travel and leisure services. The presence and growth of these platforms signify a maturing OTA market wherein differentiators are not just scale and reach but also innovation in user experience and service specialization. Lastly, the third tier consists of a wide array of OTA platforms with varying degrees of market presence and specialization [6]. This tier reflects the vibrant entrepreneurial activity within the smart tourism ecosystem, where smaller platforms cater to specific segments or unique travel needs. The proliferation of these platforms is indicative of the dynamic nature of the smart tourism sector, where technology enables a more personalized and user-centric approach to travel.

In conclusion, the stratification of OTAs into three tiers provides valuable insights into the competitive landscape of the smart tourism industry. The dominance of tier-one platforms like Ctrip demonstrates the significant role of strategic acquisitions and technological advancements in maintaining market leadership. Meanwhile, the diversity and specialization of services in the second and third tiers highlight the evolving consumer expectations and the need for continuous innovation in the smart tourism domain. This tiered analysis not only sheds light on the current state of OTA development but also sets the stage for understanding their future trajectories in enhancing the smart tourism experience.

2.2.2. Status of Smart Tourism Construction in Scenic Areas

This paper suggests that apart from the provincial capital of Nanchang, other cities in Jiangxi Province focus on promoting their renowned local attractions. For instance, Lushan in Jiujiang, Longhu Mountain in Yingtian, and Wugong Mountain in Pingxiang prioritize OTA platforms tailored around these scenic spots to highlight their unique features [7]. While it's understandable for cities with limited budgets to focus resources on promoting famous scenic areas, this approach makes it challenging for less-known and smaller scenic spots to develop smart tourism.

In terms of smart tourism construction specifics, renowned scenic areas are ahead. For example, Longhu Mountain established its e-commerce platform in 2009 and had started collaborating with major OTAs like Ctrip and Lvmama by 2011. Famous scenic spots with superior initial endowments

tend to have more mature smart tourism constructions and possess higher bargaining power in negotiations with OTAs. Eventually, when tourist numbers saturate, these spots can afford to develop their OTAs. Longhu Mountain, for instance, has created a WeChat public account and an official tourism website, indicating a relatively advanced level of smart tourism development compared to lesser-known scenic spots.

2.3. Collaborative Models of the Smart Tourism Supply Chain

2.3.1. Definition of Smart Tourism Supply Chain Collaboration Models

Based on the literature on smart tourism supply chain collaboration, three models have been identified in the construction of smart tourism. The first is an independent development model for scenic spots, while the other two can be differentiated based on the degree of collaboration and the responsibilities of supply chain members, known as the regional smart tourism supply chain collaboration model and the holistic smart tourism supply chain collaboration model.

(1) Independent Development Model

The independent development model refers to scenic spots maintaining a high degree of autonomy in smart tourism construction, with a low level of collaboration. Scenic spots adopting this model usually have strong initial endowments, high fame, ample funding, strong regional competitiveness, unique tourism advantages, and rich cultural backgrounds. For example, Tengwang Pavilion in Nanchang and Yellow Crane Tower in Wuhan, with ancient literary works like "Preface to the Pavilion of Prince Teng" and "Viewing the Yellow Crane Tower," have endowed them with unique cultural values and enhanced their tourism competitiveness.

The advantage of this model lies in its ability to make the tourism resources of scenic spots irreplaceable. By leveraging their unique resources to develop distinctive tourism cultures, these spots can form high barriers and enhance their unique tourism competitiveness [8]. However, the downside is the considerable demand it places on the initial endowments and financial pressure of the scenic spots. Additionally, a low willingness to collaborate can affect other members of the supply chain, leading to a reduction in overall collaborative intention, which is detrimental to the long-term development of the entire smart tourism supply chain.

(2) Regional Smart Tourism Supply Chain Collaboration Model

The regional smart tourism supply chain collaboration model enhances the linkage between scenic spots, with tourism management institutions playing a supportive and auxiliary role. This paper summarizes the basic essence of regional smart tourism supply chain collaboration as follows: different regional entities, starting from the information service needs of tourists, based on certain statutes, agreements, or contracts, and relying on new information technology means such as the Internet of Things, artificial intelligence, cloud computing, and mobile communication technology, re-optimize and combine various tourism resource elements between regions to achieve the maximum economic, social, and ecological benefits of a new smart tourism economic activity among regional collaborative entities [9]. Applying smart tourism to regional tourism can promote the structured progress of the entire regional tourism.

The regional smart tourism supply chain collaboration model is the result of agreements reached by members of the supply chain for overall interest transfer and organic integration. Specifically, after OTA platforms collect feedback on tourists' travel experiences, they rely on modern information technology and artificial intelligence to coordinate the various elements of the tourism system, thereby enhancing the travel experience throughout the region. This model requires a wealth of scenic spot resources in the region to form a complementary tourism resource structure, and the infrastructure and informationization level of scenic spots must also reach a certain standard. Regional smart tourism supply chain collaboration can overcome the double marginal effects

common in general supply chains, forming a good situation where large scenic spots assist smaller ones, share platforms and technologies, and fully stimulate the flow of funds, management, and information resources throughout the region, thereby helping the entire region enhance the overall quality and economic level of tourism. This model has been successfully implemented in the Wugong Mountain scenic area. The WeChat mini-program "Jiangxi Wugong Mountain Scenic Area" not only provides various transportation and scenic area reservation services but also drives peripheral tours and customized tours, allowing tourists to experience Wugong Mountain while also connecting with surrounding scenic spots [10]. The advantage of this model lies in its strategic depth of collaboration, promoting the development of all supply chain members and shifting from individual rationality to collective rationality. Regional smart tourism supply chain collaboration can supplement the resource deficiencies of individual scenic spots, integrate and complement the internal advantages of multiple scenic spots in the region, and share resources and technologies. However, the downside is that the regional smart tourism supply chain collaboration involves many members with complex interest relationships, making it difficult to determine the cost-benefit ratio and returns of each member's investment. When major interest distribution issues arise, due to the difficulty in quantifying each party's contributions, the interest distribution problem among members in regional smart tourism supply chain collaboration requires a strong member to integrate, thereby eliminating conflicts of interest among members and achieving the overall interest coordination of the entire regional smart tourism supply chain.

(3) Holistic Smart Tourism Supply Chain Collaboration Model

In the holistic smart tourism supply chain collaboration model, tourism management institutions play a crucial role in promoting the development of the entire supply chain. The key difference between this model and the regional smart tourism supply chain collaboration model lies in the positioning of tourism management institutions within the supply chain [11]. In the regional model, the emphasis is on the linkage between scenic spots, with tourism management institutions playing a supportive role. In contrast, in the holistic model, tourism management institutions play a macro-regulatory role. Tourism management institutions need to guide the entire city's smart tourism collaboration through documents and policy directions, actively communicate with scenic spots and OTAs, and timely coordinate the supply chain. When necessary, they can also use the strong financial support of tourism management institutions to build a new OTA platform to collaborate with the city's scenic spots, thereby assisting less endowed scenic spots in their smart tourism construction.

The holistic smart tourism supply chain collaboration model is generally driven by tourism management institutions. At the national level, the State Council issued the "Guidelines for Promoting the Development of Holistic Tourism" in 2018, and at the local level, guidance documents such as the "Holistic Tourism Demonstration Area Acceptance Standards" were issued to build holistic smart tourism. These policy documents highlight the importance of tourism management institutions in the holistic smart tourism supply chain collaboration, playing an active role in promoting the model. After leading policy initiatives, tourism management institutions must also plan the holistic smart tourism supply chain collaboration, with their plans impacting the development process of the entire collaboration. Therefore, planning should be practical, considering the active role of strong members while also conceding benefits to weaker members of the supply chain to achieve stable holistic smart tourism supply chain collaboration [12].

Tourism management institutions should also promote the image of scenic spots. Some small and medium-sized scenic spots, due to their initial endowments, also lag in funds and management concepts. In such cases, tourism management institutions should timely assist in promotion, easing the financial and talent management pressures on scenic spots. In holistic smart tourism supply chain collaboration, tourism management institutions should actively expand their promotional methods and content after formulating basic promotional strategies, adapting to the times and establishing a

multi-dimensional and multi-level promotional system. For example, with the rise of new media such as Douyin (TikTok), Weibo, and Qunar, tourism management institutions can collaborate with scenic spots to promote in ways that reflect contemporary trends and preferences.

3. Conclusion

The analysis of smart tourism supply chain collaboration models reveals a complex ecosystem involving various stakeholders, each playing a pivotal role in the development and sustainability of smart tourism initiatives. The independent development model, regional smart tourism supply chain collaboration model, and holistic smart tourism supply chain collaboration model offer different pathways for integrating smart tourism practices. However, challenges persist, particularly in the inclusion of smaller scenic spots and the effective coordination among stakeholders. The findings underscore the importance of strategic collaboration, facilitated by supportive policies and the proactive role of tourism management institutions, in fostering a sustainable and inclusive smart tourism ecosystem. Moreover, the adaptation to new technologies and media for promoting smart tourism underscores the dynamic nature of the industry, requiring continuous innovation and flexibility. Ultimately, the success of smart tourism initiatives hinges on the ability of all stakeholders to work together towards shared objectives, enhancing the tourism experience while preserving the cultural and environmental integrity of destinations.

References

- [1] El Archi, Youssef, et al. "Systematic literature review analysing smart tourism destinations in context of sustainable development: Current applications and future directions." *Sustainability* 15.6 (2023): 5086..
- [2] Chakim, Mochamad Heru Riza, et al. "The relationship between smart cities and smart tourism: using a systematic review." *ADI Journal on Recent Innovation* 5.1Sp (2023): 33-44.
- [3] Hugos, Michael H. *Essentials of supply chain management*. John Wiley & Sons, 2024.
- [4] Rolf, Benjamin, et al. "A review on reinforcement learning algorithms and applications in supply chain management." *International Journal of Production Research* 61.20 (2023): 7151-7179.
- [5] Jolene, Kate. "The influence of online travel agencies (otas) on Hotel Revenue and Distribution Strategies." *Journal of Modern Hospitality* 2.1 (2023): 14-25.
- [6] Hien, Nguyen Ngoc, et al. "The tendency of consumers to use online travel agencies from the perspective of the valence framework: The role of openness to change and compatibility." *Journal of Open Innovation: Technology, Market, and Complexity* 10.1 (2024): 100181
- [7] Vemuri, Naveen Vemuri Naveen. "Enhancing Human-Robot Collaboration in Industry 4.0 with AI-driven HRI." *Power System Technology* 47.4 (2023): 341-358.
- [8] Saif, Abdu, et al. "Multi-UAV and SAR collaboration model for disaster management in B5G networks." *Internet Technology Letters* 7.1 (2024): e310.
- [9] Corvello, Vincenzo, Annika Steiber, and Sverker Alänge. "Antecedents, processes and outcomes of collaboration between corporates and start-ups." *Review of Managerial Science* 17.1 (2023): 129-154.
- [10] Kumar, Aman, and Amit Shankar. "Why do consumers forgive online travel agencies? A multi-study approach." *Australasian Marketing Journal* (2023): 14413582231194071.
- [11] Hossain, Zaber, et al. "INVESTIGATING TOURISTS' ONLINE TRAVEL AGENCY SELECTION INTENTION: AN EMPIRICAL ANALYSIS ON BANGLADESH." *Geo Journal of Tourism and Geosites* 50.4 (2023): 1212-1223.
- [12] Garcia, Michelle. "Consumer Buying Behavior on Travel Products through Online Travel Agencies." Available at SSRN 4442816 (2023).