Research on the Upgrading of Shenzhen Smart Tourism Network Service System

From the Tourist-oriented Perspective

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Abstract. At present, web and mobile terminals have acted as important infrastructures in the public's daily life, and the information technology orientated to which has gradually penetrated into the tourism, such as big data platforms, intelligent service products, etc., which have received widespread attention. In this study, the research method of field research and questionnaire analysis is adopted from a tourist-oriented perspective to analyse the current situation of the smart tourism network service system in Shenzhen and put forward countermeasures and suggestions for the future development of Shenzhen's smart tourism, with a view to provide wisdom and solutions of Shenzhen for the high-quality construction of tourism in the Guangdong-Hong Kong-Macao Greater Bay Area of China.

Keywords: Tourist-oriented Perspective, Smart Tourism, Network Service System, Shenzhen

1 Introduction

In 2020, the domestic tourism industry was hit hard by the global COVID-19 pandemic. After production and life return to normal in 2023, the recovery of tourism has also triggered widespread concern in the industry and academia. The domestic tourism industry needs a strong strategy of industrial transformation and upgrading to change the original layout in order to realize steady growth in the Internet era. Therefore, it is urgent to realize the intelligent management through transformation and renovation, led by the trend of digitization.

In recent years, the Ministry of Culture and Tourism and other ten departments jointly of China issued the “Opinions on Deepening ‘Internet + Tourism' to Promote High-Quality Development of Tourism”, which points out that the high-quality development of tourism should be promoted by digital empowerment to ensure the high-quality supply of tourism products, and puts forward a series of specific goals: by

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2022, a series of intelligent tourism scenic spots will have been constructed. By 2025, the national 4A and above scenic spots have striven to fully realize the digital transformation. It can be seen that "Intelligent technology + Tourism" that based on information technology has become the key construction project in China. Shenzhen as one of the core cities in the Guangdong-Hong Kong-Macao Greater Bay Area as well as an advanced demonstration zone of socialism with special characteristics approved by China, relying on advantages such as policy support and infrastructure, has achieved remarkable results in smart tourism.

This paper adopts the method of literature combing, fieldwork combined with quantitative research to analyse the construction situation of smart tourism and related the experience of network service in Shenzhen from a tourist-oriented perspective through tourist satisfaction, and provide relevant countermeasures and suggestions that in order to enhance the core competitiveness of Shenzhen to become a world-class tourist destination, as well as form the distinctive development plan of smart tourism for other cities in the Pearl River Delta Region as reference provided. In addition, this study is to give an empirical complement to the theories related to smart tourism and the application of web technologies.

2 Literature Review

With the enhancement of social digitization, information technologies such as big data, Internet of things, artificial intelligence have been highly developed and applied in all walks of life. The Web and mobile terminals have acted as an important infrastructure in the public's daily life, and information technologies oriented by which are gradually penetrating in the tourism, and the concept of smart tourism has came into being. Smart tourism could be defined as the ubiquitous tourism information service received by tourists in the process of tourism activities[1], which is for the specific application of intelligent information technology services in the tourism, for example, taking the scenic spots as main body smart tourism mostly focus on the four aspects: smart service, smart management, smart experience and smart marketing[2] and from more macro perspective, the government's consideration to smart tourism could be broader, including tourism enterprises, tourist sources, tourist destinations, tourism administration, and constant technological innovation[3]. The four core technologies of smart tourism to support those functions mentioned are Internet of Things (IoT), mobile communication, cloud computing, and Artificial Intelligence [4] that could provide information and services the travelers, the tourism administrator at all levels in each step of tourism activities. In order to manage intelligently to meet the challenges of tourism as well as other service industries, it is necessary to improve the service to tourists [5] so as to gain sustained competitive advantage by meeting changing customer needs [6], thus tourist experiences are the key information to be referenced that essential to the improvement and innovation of tourism products and services [7]. Widely coordinated and shared data, both in tourism smart destinations and economic ecosystems, has great help on reconstructing and ameliorating consumer experiences [8] thus tourist-orientation is an important perspective in smart tourism network ser-

vice system research.

Shenzhen is one of the four core cities in the Guangdong-Hong Kong-Macao Greater Bay Area as well as an advanced demonstration zone of socialism with special characteristics approved by China, enjoying political, economic, policy and talent support, which provides strong boost for the construction of its smart tourism [9]. The particularity of the smart tourism in Shenzhen determines that its smart tourism is in a compound and sustainable development pattern driven by scientific and technological level, talent team, as well as the joint action of factors include government, enterprises and environmental. One-stop intelligent service mode is one of its connotations, which points to the integration of scenic spots, surrounding facilities and industries and the integration of scenic spots in the region. Based on this, the network service system is the key for directly affecting the construction and development of smart tourism.

Shenzhen in recent years has made some achievements in the construction of smart tourism with the solid guarantee of transportation facilities, communication facilities and talent introduction mechanism built around the region, but it should also be seen that there are still shortcomings in intelligent level of urban construction. Meanwhile, with the continuous rise of the network and emerging technologies, tourism and high-tech industries continue to deepen the integration of the tourism industry, the tourism industry to promote its industrial transformation and upgrading.

In summary, this study has innovation in the following aspects. Firstly, from an academic perspective, there is currently a lack of research on the development of tourism in super first tier cities from a tourist based perspective in the academic community. Tourists are the most important audiences for tourism development, making the study of tourist based theory particularly important. Moreover, as a special economic zone in China, Shenzhen has important location attributes in the overall strategic layout of the country, which has attracted a large number of tourists to visit. Unfortunately, the research on the transformation and upgrading of Shenzhen's tourism network service system in the academic community is far from adequate, and empirical case studies on it urgently need to be supplemented. Secondly, from a practical perspective, this study has derived clear system optimization strategies from quantitative evidence, which can provide actionable practical paths for all parties involved. At the same time, this study provides a direction for thinking about the development of Shenzhen's networked tourism industry, which could be a reference exploration plan.

3 Research Methods and Analyses

This study carried out quantitative research on the basis of field investigation on various scenic spots in Shenzhen, taking locals and tourists as the objects, collecting data through questionnaires, obtaining and analyzing the specific construction situation of the network service system in Shenzhen smart tourism. The questionnaire is been designed taking Liu's theory of smart tourism evaluation index system (2013) as a reference that contains the hardware support index system, the comprehensive application system, and the application value system, and also combines with references of

the characteristics and basic thoughts as well as the propelling-mode-related theory of smart tourism [10]. The specific index of the questionnaire are the satisfaction of smart city construction, smart tourism and smart scenic spot construction. The overall questionnaire has been tested for reliability, and the result is above 0.7 that with a high degree of credibility.

The Questionnaires is mainly collected both online and offline. The offline way is to distribute questionnaires in crowd gathering places in scenic spots. In addition, this study also adopts online questionnaire collection to increase the sample size, inviting people from all over the country who had experienced smart tourism in Shenzhen to fill in. A total of 302 questionnaires were obtained in this study, out of which 301 questionnaires were valid, with a validity rate of 99%, and finally the collected data were statistically analyzed with SPSS 25.0. The main demographics of the respondents and travel-related information are shown in Table 1.

Table 1. Demographics of the study subjects and travel-related information.

Feature	Constituent ratio (%)	Feature	Constituent ratio (%)
Gender		Accession	
Male	47.8	New media platform	66.7
Female	52.8	Search engine	59.1
Age		Professional site platform	49.5
Under 18 years old	6.64	OTA platform	48.8
18-25 Years old	53.1	Recommended by others	27.9
26-55 Years old	36.5	Other	5.3
Over 56 years old	9.3	Tourist Scenic Spot (Shenzhen)	
Career background		5A scenic spot	79.0
Enterprise administrator	11.9	4A scenic spot	67.4
Service and Sales Personnel	11.6	3A scenic spot	54.8
Public functionary	9.3	Non-A-level scenic spots	32.2
Cultural, educational and technical personnel	5.98	Other	8.9
Labourer	6.97		
Military Police	7.64		
Medical personnel	6.97		
Freelancer	8.63		
Other	4.3		

3.1 The Satisfaction with Smart Infrastructure Construction

The public's satisfaction with the basic field of smart city in the study can mainly reflect in three aspects as shown in Table 2: network infrastructure, city management facilities and communication infrastructure. The results show that in the dimension of network infrastructure, the percentage of dissatisfied, barely satisfied and satisfied people respectively were 0, 2.66% and 97.01%, with the average score of 4.18. The standard deviation value was small at 0.59 indicating that the pattern of data distribution was relatively concentrated, from which it was judged the stable and reliable data as well as the high objectivity of the analytical results. Secondly, in the dimension of city management facilities, the percentage of dissatisfied, barely satisfied and satisfied people respectively were 0, 3.65% and 96.35%, with the average score of 4.34 and the small standard deviation value of 0.67. In addition, in the dimension of communication infrastructure, the percentage of dissatisfied, barely satisfied and satisfied people respectively were 0.33%, 3.65% and 96.02%, with the average score of 4.29 and also the small standard deviation value of 0.66.

The survey results demonstrate that the public's satisfaction with the infrastructure construction in Shenzhen is generally high, but there are still a small number of tourists who are barely satisfied with the infrastructure, which may be related to the phenomenon of uneven infrastructure in various regions of city.

Table 2. Tourists' satisfaction with smart infrastructure.

Dimension	Satisfaction			Average score (out of 5)	SD
	Dissatisfied	Barely satisfied	Satisfied		
Network infrastructure	0	8(2.66%)	293(97.01%)	4.18	0.59
City management facilities	0	11(3.65%)	290(96.35%)	4.34	0.67
Communication infrastructure	1(0.33%)	11(3.65%)	289(96.02%)	4.29	0.66

3.2 The Satisfaction with Information Acquisition in Smart Way

Information accession is an important part in the process of smart tourism, which could be investigated based on the perspective of tourists' access to information on tourism destinations in smart platform based on Internet technologies. The index included are mainly content richness of the tourist destination related web pages, information timeliness of the tourist destination related web pages, layout design of the the tourist destination related web pages and maturity and integrity of the mobile app software related to tourist destination as shown in Table 3.

The results show that in the dimension of content richness of the relevant web pages, the percentage of dissatisfied, barely satisfied and satisfied people respectively were 0, 4.98% and 95.02%, with the average score of 4.36, and the small standard deviation value of 0.69. In the dimension of information timeliness of the relevant

web pages, the percentage of dissatisfied, barely satisfied and satisfied people respectively were 0.66%, 5.65% and 93.69%, with the average score of 4.32, and the small standard deviation value of 0.72. In the layout design dimension of the relevant web pages, the percentage of dissatisfied, barely satisfied and satisfied people respectively were 1%, 8.97% and 90.03%, with the average score of 4.28, and the small standard deviation value of 0.78.

In addition, in the maturity and integrity dimension of mobile app software related to tourist destinations, the percentage of dissatisfied, barely satisfied and satisfied people respectively were 1%, 8.97% and 90.03%, with the average score of 4.24, and the small standard deviation value of 0.75.

Table 3. Tourists' satisfaction with information acquisition in smart way.

Dimension	Satisfaction			Average score (out of 5)	SD
	Dissatisfied	Barely satisfied	Satisfied		
Content richness of the tourist destination related web pages	0	15(4.98%)	286 (95.02%)	4.36	0.69
Information timeliness of the tourist destination related web pages	2(0.66%)	17(5.65%)	282 (93.69%)	4.32	0.72
Layout design of the the tourist destination related web pages	3(1%)	27(8.97%)	271 (90.03%)	4.28	0.78
Maturity and integrity of the mobile phone app software related to tourist destination	3(1%)	27(8.97%)	271 (90.03%)	4.24	0.75

The survey results show that the public is generally satisfied with the acquisition of smart tourism information in Shenzhen, but it is worth noting that in terms of interface aesthetics and network platform construction, the satisfaction with the maturity and completeness of the tourism destination's web page layout design and mobile APP is relatively low, which needs to be given attention and upgraded.

3.3 The Construction of Smart Facilities of Scenic Spots

The survey of smart facilities in scenic spots focuses on the presence or absence of the intelligentialize in parking and ticketing facilities, tour auxiliary equipment, information platform, and other smart facilities (Virtual Reality, Artificial Intelligence, etc.).

According to this sample analysis as shown in Table 4, 95.36% of the passengers indicated that the scenic area has intelligent parking and ticketing system while the remaining three dimensions all reach more than 84%. It can be seen that there are

intelligent facilities in most scenic spots, and the construction level of intelligent facilities is relatively high in Shenzhen.

Table 4. Tourists' perception to intelligent facilities in scenic spots.

Smart facilities	Presence	Absence
Parking and ticketing facilities	288(95.36%)	14(4.64%)
Tour auxiliary equipment	253(84.33%)	48(15.67%)
Information platform	257(85.67%)	43(14.33%)
Other Facilities (VR, AI, etc.)	266(88.37%)	35(11.63%)

3.4 Overall Results

From the perspective of tourists' satisfaction linked to the construction of smart tourism service system with smart tourism network service in Shenzhen, it could be found that the government as well as various tourism enterprises relying on economic development and the popularization of information technology, quickly established a smart tourism network service system, which made overall the high level of satisfaction in the smart infrastructure, smart tourism information accession, also most of the scenic spots that equipped with smart facilities were perceived by tourists.

However, there are also problems reveal such as uneven infrastructure construction in various regions, insufficient aesthetic effort on web page interface and insufficient app network platform construction. Meanwhile, in the process of questionnaire collection, tourists reported that the applied and innovative degree of some facilities and the promotional effort of smart tourism also should be considered. Those issues mentioned above are closely related to the planning and management mode, service construction mode and marketing mode of city smart tourism.

4 Strategy and Discussion

Based on the results above, this study is going to propose relevant countermeasures and suggestions for the three important dimensions in smart tourism, namely top-level design, service mode, and marketing, from the perspectives of the government, tourism enterprises, and media platforms as shown in Fig. 1.

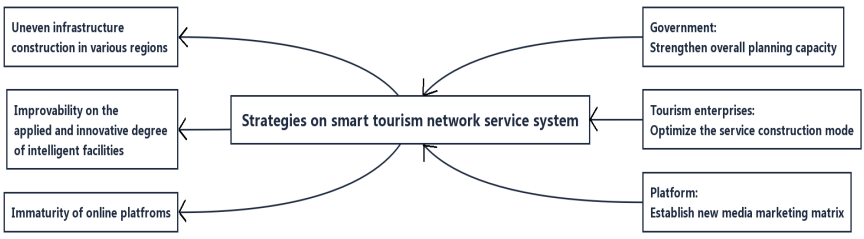

Fig. 1. Strategies on smart tourism network service system (Owner-drawing)

4.1 Government: Strengthen Overall Planning Capacity

The efficient construction of smart tourism as a complete set of smart tourism network information platforms as the system support, meanwhile, the upstream and downstream links of the tourism industry and the cooperation of various government departments are also necessary. The overall city smart tourism of the city is a top-level project with essentially long construction routine, large investment capital, and strict technical requirements that the government's supervision, the self-discipline of enterprises as well as the cooperation between departments and industries all play a decisive role. Only by reasonable job of top-level design of overall planning and clear division of rights and responsibilities, could all the principals in the service system perform their duties, makes the industry to form a joint force from the top to the bottom, and thus promote the smart tourism network service system through management. In addition, at the process of the construction to smart tourism platforms and facilities, the scenic spots or relevant government departments have paid insufficient attention to the feedback port and two-way response mechanism to tourists, more of them are only set feedback channels at the bottom of the web pages and not obvious. The bottom-up feedback absorption and management mechanism in the web service system for both the complement of management structure and grasp of passenger needs is extremely necessary.

Furthermore, from the perspective of top-level design, accelerating the construction of information infrastructure should be given priority to the investment and development of big data applications, and the modernization of the public service capacity and social governance capacity as well. In addition, raising the investment scale of government financial funds in order to attract social capital to entry the field. Draft practical plans could be required to promote improvement from relevant experts and entrepreneurs.

4.2 Tourism Enterprises: Optimize the Service Construction Mode

First of all, many scenic spots are shifting from traditional tourist spots to digital and intelligent scenic spots in Shenzhen which means some old scenic spot guide equipment need to be updated and upgraded. In addition, to strengthen the construction of smart service platforms, integrate scattered tourism resources, and coordinate the relationship among tourism enterprises, tourism resource and tourists might be efficient way. Tourism-related industries such as catering, transportation and accommodation will be integrated into online platforms, and an online intelligent service system will be established.

Moreover, based on the smart service platforms built by tourism enterprises it could realize the function of collecting the needs of tourists through big data, constantly update the tourism products suitable for them as well as improve the feedback rate of them. The evaluation system of smart tourism could get designed by scientifically supplementing evaluation method of the development stage of smart tourism and the Weibo & WeChat Index evaluation.

4.3 Platform: Establish New Media Marketing Matrix

The integrated marketing mode focuses on shifting the thinking from passive to active that Shenzhen needs to combine the original scenic area structure, create new theme activities, enhance tourists' interest, and develop coastal cultural tourism based on the its distinctive coastal culture. In addition, scenic spots should be positioned accurately and then target local tourism resources, continuously explore tourism characteristics to clarify the characteristics of their own and then identify related IP's properties. Then, the management should be formulating strategies for IP building to transform the scenic areas into overall smart scenic areas with city's own characterization by clarifying a macro tourism image. Properly combining natural scenery with man-made landscape to build the first large-scale comprehensive tourism resort in China integrating leisure, sightseeing, outdoor sports and science education.

On the other hand, the publicity matrix may be put into daily use, such as online new media publicity through official websites, official account on Weibo & WeChat platforms and other online social platforms like Xiaohongshu as well as short video apps like Tik Tok or travel bloggers' account on those platforms mentioned above to promote information by new media. Additionally, the online operation of new media in scenic spots requires dedicated personnel to maintain and improve marketing intensity and sustainability.

5 Conclusion

Through this study, the empirical data demonstrated that though there were still some shortcomings, Shenzhen has rapidly established a smart tourism network service system in continuous development. From the tourist-oriented perspective, it is mainly reflected in two aspects: the high degree of both overall satisfaction and equipment of intelligent facilities in scenic spots. Based on the current construction status of smart tourism services in Shenzhen, improving the planning and management, service construction mode, and marketing mode can be used as the three main approaches to improve the network service system in the future construction and development of smart tourism in the city. This study admittedly still has some limitations. For example, it has not yet explored the influencing factors and sustainable internal mechanisms of Shenzhen's smart tourism and smart city development. Future studies will expand the sample size to establish research models.

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