The Operation of Hangzhou Smart Tourism Project
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Abstract. With the expeditious development of the new generation of information technology, the new generation of management system, Smart Tourism, has become a valuable method to accelerate the transformation and development of the tourism industry. This paper introduces the operation of Hangzhou Smart Tourism Project from the basic assurance to the work platform. The latter consists of office automation, industry management, marketing promotion, public service, and tourism strategic diagnosis and decision platform. It provides a reference for establishing a holistic intelligent management system of a celebrated tourism destination.

Introduction
At the National Cybersecurity and Informatization Work Conference, Chinese national leader Xi Jinping emphasized that informatization has brought a rare opportunity for the Chinese people. As a traditional tourist destination with the saying “in heaven there is paradise, on earth Hangzhou and Suzhou”, at the beginning of this century, Hangzhou put forward the strategy of “Paradise Silicon Valley”, focusing on building an innovative city and vigorously developing information software, network equipment, e-commerce and cultural creativity [1]. In order to keep up with the pace of information development in the city, Hangzhou Tourism Commission compiled a Hangzhou Smart Tourism Project in 2013 and introduced a revised version in 2018.

This paper provides an overview of the Smart Tourism, and a recent development concerning this concept, that is the operation of Hangzhou Smart Tourism Project. A closer look at the Hangzhou example is also given. It describes the experience of establishing a holistic intelligence system from which official operators of tourism industry (and other service providers) may gain new ideas.

Concepts of Smart City and Smart Tourism
In 2008, International Business Machine (IBM) first proposed the concept of Smarter Planet, pointing out that it will change the governments, industries and individuals by using a new generation of intelligent systems and technologies, such as smarter power grids, smarter food systems, smarter water, smarter healthcare, smarter traffic systems. And with more information and data being captured than ever before, sophisticated analytics and algorithms were being developed that could make sense of it all [2].

The Smarter Cities campaign launched by IBM is the actual approach of Smarter Planet applying to specific region, achieving the informational and integrated management of cities [3]. When this concept is no longer just a strategic project of IBM, but a recognized future trend, it is more called Smart Cities instead of “Smarter” Cities. According to Wikipedia, a Smart City is an urban area that uses different types of electronic data collection sensors to supply information which is used to manage assets and resources efficiently. It can make intelligent response to different kinds of needs, including daily livelihood, environmental protection, public safety and city services, industrial and
commercial activities [3]. Thus, a Smart is a city that has made their system instrumented, interconnected and intelligent [4]. Instrumentation denotes that city activities are measurable by sensors that scattered around the city; interconnection means that every bit of a city is connected through ICT network both wired and wireless; and intelligence refers to predictive applications that have the ability to generate more accurate decisions [5].

Under the guidance of an official document [6], the China tourism industry began to seek the reconstruction of the tourism industry system and service management model with information technology as the link. Inspired by the concept of Smart City and its development in China, Smart Tourism came into being. In 2010, Zhenjiang City of Jiangsu Province took the lead in creatively proposing the concept of “Smart Tourism” and carrying out the construction of Smart Tourism project. After that, Nanjing, Suzhou, Huangshan and other cities and provincial governments also began to participate in the construction of smart tourism.

From the perspective of the city, Smart Tourism can be regarded as an important subsystem of Smart City information network and industrial development. Some functions of Smart Tourism can share the existing achievements of Smart City. Because Smart Tourism focuses on public management and services, incorporating Smart Tourism into Smart City helps to save resources. However, it’s worth noting that due to the differences in characteristics and needs of tourists and urban residents, Smart Tourism and the tourism segment under the Smart City system are different concepts, tourism does not only occur in cities; Smart Tourism has a boarder connotation [7].

The Core Ideas of Hangzhou Smart Tourism Project

Based on the requirements and encouragement of a series of government documents [8-10], Hangzhou Municipal Tourism Commission quickly started work on Hangzhou Smart Tourism Project. Although the tourism management agencies of government can’t perfectly control the development of tourism in normal conditions, the macro-direction guidance such as Smart Tourism project can effectively promote the prosperity of the whole tourism industry. The core ideas of Hangzhou Smart Tourism Project are as follows.

An updated system assorted by functions. Some cities have already built the foundations of tourism informatization construction, such as the systems of Smart Management, Smart Marketing and Smart Services. However, these systems only stayed at the level of “information system”, and didn’t consider from the actual application of tourism profession, so it is hard to truly solve the core demands of the tourism industry, or improve the quality and efficiency of tourism operation.

The system developed in Hangzhou Smart Tourism Project is related to the responsibilities of the existing offices of Hangzhou Municipal Tourism Commission, which are industry management, marketing promotion, and public services. The fragmented informatization systems will be systematically integrated by the functions, which will better enhance the management, service and marketing capabilities of the tourism department and truly realize the tourism of “smart”.

Multi-source data sharing based on data channel. For the tourism industry itself, the interconnection of tourism information, especially tourism-related data, is the basis of Smart Tourism Project. Mastering the data resources will provide a more comprehensive understanding of the development of the city’s tourism industry, thereby support Smart Management, Smart Marketing and Smart Services.

Based on the big data center of All-for-one Tourism established in the past, Hangzhou has opened up the data channels of each office in the Hangzhou Municipal Tourism Commission, and established data channels with external governmental departments. It provides the most basic data sources for big data analysis and application, and elevates the flow and dissemination of information. Through the sharing and integration of the multi-source data, big data will be able to contribute to Hangzhou Smart Tourism Project.

Intelligent decision-making and diagnosis driven by big data. Big data has apparent advantages in phenomena description, cause diagnosis, and predictive analysis. Based on the full convergence of multi-source big data, Hangzhou deeply explores and analyzes the relationships between data and phenomena, to conduct intelligent decision-making and diagnosis for tourism industry.
For example, Hangzhou monitors various tourism big data to detect and diagnose the overall operation of the tourism industry, as well as the behavior of tourists, to identify the core advantages of regional tourism, identify the key issues, and propose solutions to achieve the rapid development of the tourism industry.

The key to the operation of Hangzhou Smart Tourism Project is to integrate the data into the basis of intelligent decision-making, that is to let big data support industrial management, marketing promotion, and public service decision-making through the integration and utilization of it.

Multi-sector collaboration. The multi-sector collaboration is the most basic assurance for Hangzhou Smart Tourism Project. As the main leader of this project, Hangzhou Municipal Tourism Commission not only undertakes the overall planning and leadership of the city’s Smart Tourism construction, but also is the key hub of the national and provincial administrations as well as the local districts and counties. In addition, it is an important component of Smart City system.

The data channels between various departments have been opened by the multi-sector collaboration, which enables the interconnection and sharing of tourism-related information. Moreover, this mechanism has revolutionized the processes and made information technology a real player in the tourism industry. For example, in the case of emergency, the tourism-related information will be shared with the emergency department immediately, and the crisis will be resolved in time under the lead of the emergency department as well as the cooperation of all other departments. Thus the safety of residents and tourists is guaranteed with the help of the intelligent linkage of Hangzhou.

The Operation of Hangzhou Smart Tourism Project

Based on the above core ideas, the following part will explain the operation of Hangzhou Smart Tourism Project from the aspects of basic assurance and work platform.

Basic assurance. In order to carry out the Hangzhou Smart Tourism Project smoothly, some basic work needs to be done as the implementation basis including building a vertical support system, formulating a unified All-for-one plan, upgrading the big data center, and building related infrastructure.

(1) Vertical support system. In order to build a vertical support system for the project, Hangzhou adopted the latest generation of resource cloud technology, and integrated the Smart Tourism platform of the city using the SaaS (Software-as-a-Service) method.

The vertical support system makes the Smart Tourism management system of city level and district and county level no longer secluded in data and application. For example, in the application of big data, through this integrated system, the existing tourism-related data of Hangzhou Municipal Tourism Commission can serve all districts and counties downwards, each district and county will supplement and correct the data and items to improve the integrity and accuracy of the data, while reducing the waste of financial funds due to repeated purchases of data, thus forming an efficient circle of linkages.

(2) Collaborative All-for-one plan. Hangzhou uses a set of unified standards to guide the Smart Tourism construction of all districts and counties, and introduces the unified guidance of Smart Tourism construction with Hangzhou characteristics for the scenic spots, hotels, travel agencies, villages, and all other main body in tourism industry.

(3) Big data center of All-for-one Tourism. Guided by applied functions, Hangzhou has carried out overall planning and deployment of the pre-built big data center of All-for-one Tourism for Hangzhou Municipal Tourism Commission, Municipal Data Resource Administration, as well as tourists, travel agencies and other main body in tourism industry. The efforts include 1) gathering the internal business system data of Hangzhou Municipal Tourism Commission; at the same time, opening up the channel of tourism core data related to the Ministry of Culture and Tourism, 12301 National Smart Tourism Public Service Platform, Zhejiang Provincial Department of Culture and Tourism and the tourism bureau of local districts; these efforts enable the data exchange and share with the horizontal department, and enrich the data source of big data center of All-for-one Tourism; 2) introducing the SaaS service structure to improve the capacity of cloud computing, big data
storage, data processing, and the cloud resource allocation management; this effort lays the foundation for the data exchange and sharing capabilities of big data center of All-for-one Tourism.

(4) Smart Tourism Destination Infrastructure. Hangzhou is currently building infrastructure for Smart Tourism in tourist destinations, such as (1) communication infrastructure in airports, stations, terminals, hotels, tourist attractions, tourist resorts, rural tourist spots, commercial areas, etc., to expand the coverage of Wi-Fi networks; (2) IoT (Internet of Things) infrastructure, to automatically collect information on tourist danger zones and tourist concentration zones; for example, use high-tech such as facial recognition system to identify the number and characteristics of vehicles and people, to manage the order of tourism market and monitor the dynamic conditions of tourist hotspots.

Work platform. Based on the functions of tourism departments in industry management, marketing promotion, public services, etc., Hangzhou uses various informatization methods such as big data and artificial intelligence to establish a Smart Tourism work platform. This platform has changed the traditional workflow related to tourism affairs, improved the efficiency of the government, and helped Hangzhou Tourism Commission to play a better role in guiding the city’s tourism development.

(1) Office automation. Based on the digital transformation requirements of the provincial government, Hangzhou tries to promote the office automation of tourism and other government departments. The specific operations include using 1) mobile office system “Dingtalk” uniformly, so that all kinds of policies and instructions timely can be timely delivered; 2) information technology to check on work attendance and schedule the timetable; 3) video conferencing, electronic official documents, data online reporting and other diversified methods to improve the efficiency.

For example, the Golden Week in China (a semi-annual 7-day or 8-day national holiday) is a major period for tourism industry. However, it is also the most prone to security incidents. Therefore, Hangzhou established a personnel scheduling mechanism during the Golden Week with information technology to standardized the personnel duty assessment process. In the past, the arrangement of duty personnel was only internal knowledge; Now, due to the information sharing of the duty personnel during the Golden Week, when there is a sudden emergency, the supervisor can dispatch the corresponding duty personnel at the first time to take support as soon as possible.

(2) Industry management. Hangzhou Smart Tourism Project has also done some work for the management of the whole tourism industry as following paragraphs, because Hangzhou Tourism Commission has supervisory responsibilities for scenic spots, accommodation, travel agencies, tour guides and other tourism-related entities.

1) Tourism complaint management. Hangzhou comprehensively gathered the complaint data from “12301” (National Smart Tourism Public Service Platform), “96118” (Zhejiang Provincial Department of Culture and Tourism), and “96123” (Hangzhou Municipal Government), to obtain the complaint information as much as possible through the multiple channels, and then timely deal with all of them. The specific complaint will be given to the relevant enterprises in order to improve their ability to handle complaints by themselves. The government will supervise the whole process.

2) Tourism law enforcement management. Based on the monitoring data from travel agencies and the relevant government departments, the system of Hangzhou Smart Tourism can predict and warn the disorder problems of tourism market. Combined the implement of electronic contracts and tickets with the involvement of social groups such as tourism associations, Hangzhou Tourism Commission can conduct strong supervision of the tourism industry through the full-process online tourism law enforcement system.

3) Public credit information and integrity management. For the untrustworthy travel agencies, scenic spots and their employees publicized on the national credit platform, Hangzhou will take corresponding restrictions and disciplinary measures cooperating with the higher authorities, and feedback the information to the National Development and Reform Commission and the Ministry of Culture and Tourism.
(3) Marketing promotion. Several departments in Hangzhou Tourism Commission have got the access to the data and tourism information of the integrated marketing management platform which was closed. This sharing effort supports the multi-language tourism websites and other new media marketing promotion (Weibo, Wechat Official Account Platform). The running condition and visitor data of the websites and other promotion platform are monitored for a continuous optimization and upgrade of the content and layout according to user needs, thus an international image of Hangzhou tourism can be shown to the world.

Based on big data, artificial intelligence and other technologies, Hangzhou built a full-process marketing work management platform to quantitatively evaluate the circumstance of the marketing investment and implement. The whole marketing process from formulation to execution to effect tracking can be administered and controlled. The input-output ratio of marketing work can be finally improved.

(4) Public Service. Hangzhou Smart Tourism Project is also designed to give full play to the role of intelligent means in public services, improve the satisfaction of tourists with public facilities, and improve the quality of tourism.

1) Tourism public information service knowledge base. Around the main problems during the tourists’ visits, Hangzhou built a multi-theme tourism public information service knowledge base with sub-information databases such as the tourism route product library. It realizes the comprehensive sharing of multi-dimensional data information, and provides a basis for decision making for regional marketing and tourism product design of Hangzhou.

2) Tourist information service. Based on the monitoring data of the tourism industry and the real-time data of the meteorological and transportation departments, combined with the contents of the tourism public information service knowledge base, Hangzhou adopts its official tourism website and new media platform (Weibo, Wechat), as well as emergency SMS release, 12301 telephone call system and other channels, to timely release tourism information to tourists and citizens to guide a better tour.

3) Collaborative response based on big data and artificial intelligence technology. Relying on the tourism public information service knowledge base, Hangzhou provides visitors with intelligent consulting services based on natural language through the platform of “Hangzhou Tourism Data Online”; continuously enriches tourism public information service knowledge base through machine learning and other means in order to improve the response speed and answering ability of tourism consultation; summarizes the most consulted and most concerned issues for tourists, to help Hangzhou Tourism Commission to improve public service capabilities.

4) Smart toilet. Hangzhou has selectively piloted a new model of smart toilets in the city, promoted innovative measures such as intelligent free paper picking, digital maps of toilets, and navigation systems. The assessment and management of toilets also run electronically with multi-source evaluation data.

(5) Tourism strategic diagnosis and decision platform. This platform relies on big data and artificial intelligence to monitor and diagnose the indicators and performance of the whole tourism market or a special tourism work. The administration can adjust the corresponding policies and management measures according to the regular big data reports or the emergency warnings.

1) Health diagnosis of the tourism market. Hangzhou comprehensively analyzed the development process of various tourism elements in Hangzhou tourism market, made reference to the development of tourism market in other cities at home and abroad, and then formulated a corresponding evaluation index system for different entities in tourism industry, as well as setting the corresponding operation for each indicator. In addition, there is also monitoring for word-of-mouth effect of urban tourism brand based on main stream domestic OTA platforms (such as Ctrip, Lvmama, Tuniu, etc.) and foreign online review websites (such as TripAdvisor, Agoda, etc.), and other online social media.

2) Intelligent diagnosis for regulatory objects. Guided by the core business of tourism, it aims to build a tourism big data application ecosystem for scenic spots, hotels, travel agencies, tour guides and other entities, and establish a continuous and stable data monitoring model to provide tracking
and diagnosis based on real-time monitoring data through not only large screens but also mobile phones. For example, lying on key indicators such as the monitoring data of scenic spot video, intelligence gate, parking lot, traffic flow, etc., combined with the data of complaint, evaluation, public opinion data and other data items, the operation of the city’s scenic spots, especially the congestion situation and public opinion of the high-grade scenic spots are monitored to diagnose the health of the tourism industry development.

Conclusions
The case of Hangzhou shows how government operates a smart-related tourism promotion project. Although the advantages of introducing Smart Tourism systems into the management of traditional tourism industry have not been apparent for the time being, it is believed that under the continuous advancement of information technology, Smart Tourism will become the basic norm for tourism management in the future.
In the study of operations management, as a part of the service industry, tourism also has a corresponding tourism service supply chain, including the source market, tourism intermediary organizations, long distance transport providers, destination service providers and other related service providers [11]. Since tourism resources are public goods, the government plays a pivotal role in the tourism service supply chain. Implementing a Smart Tourism project provides an effective solution for integrating the individual service providing organizations into a coordinated holistic system.

References