

Development of all-for-one smart tourism platforms

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Abstract. Given the development trend of the tourism industry and the challenges the industry faces, this study probes into the market needs for all-for-one tourism, analyzes the role that cloud platforms play in promoting digitalization of tourism, and introduces the application of cloud technology in four application scenarios — big data cloud platform, smart service platform, comprehensive management platform, and destination marketing platform.

1 Demand for all-for-one smart tourism

Smart tourism should be developed with the big picture in mind and based on a data center that involves all aspects of the city. The services of the government, the travel agencies and the sightseeing sites should be coordinated to ensure that all services can be realized in an integrated manner.

Development of smart tourism relies on integration of different types of data into the smart tourist platform data center to provide marketing and management tools for the governmental administrations of tourism, thereby integrating administrative operation and tourist services and maximizing the effect of synergy.

Under a coordinated framework, the city can establish a resource sharing and indexing system for smart tourist information, rely on data exchange and sharing agreements to build an efficient data integration and processing platform. The government can establish organs to collect and process data of enterprises and sightseeing sites in an organized, planned and sustained manner, create information databases of different types to provide a basis for tourism administration and collaborative decision-making, and a statistical foundation for tourist services.

All-for-one smart tourism platforms should be developed following seven design principles, i.e., the unity principle, the data sharing principle, the advancement principle, the practicability principle, the prospective principle, the standardization principle, the security and reliability principle.

2 Design of the framework of all-for-one smart tourism

2.1 Framework of the system

The overall framework of all-for-one smart tourism is to use the cloud center, the geographic information system,

Internet technology, mobile Internet, tourist service center to build a standardized maintenance and safety management system. Meanwhile, advanced design ideas including interconnection, innovation, subject-object collaboration, brainstorming are adopted to create a characteristic and highly-efficient tourism supervision system, a tourist public service system, a tourist destination marketing system, a tourist destination operation system. These systems are expected to make tourist management more intelligent and diversify the services, thereby ensuring sustainable development of the sightseeing sites.

All the informatized systems are connected by the data to generate a big data center, so that the basic-level informatization can be realized, the government can supervise the tourist industry and products, the destination operation system and the government management system can be coordinated, achieving the goal of marketing for all, comprehensive governmental management, localization of services and safe operation for all.

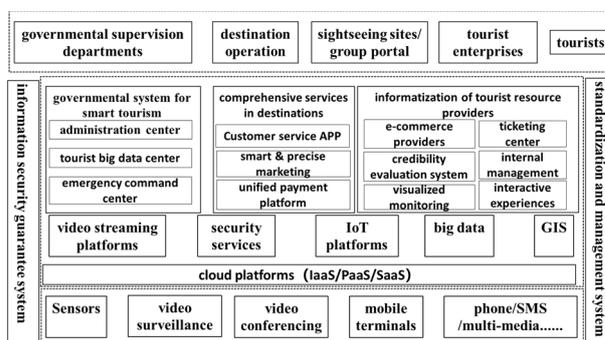


Fig 1. Overall framework of the all-for-one smart tourism platform

The framework for all-for-one smart tourism consists of three layers, i.e., the smart terminals, the cloud platform, and the service scenarios, as well as two supporting systems — the information security guarantee system and the standardization and management system.

The cloud platform is the foundation of smart tourism

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as it provides the devices to collect and transfer data in the smart tourist system. The data on the platform are strategic resources for smart tourism, as they support establishment and application of the tourist service databases. By integrating these data, the system can grasp the data about the tourist enterprises, tourist administrations and other parties involved in smart tourism to provide a basis for provision of tourist services.

The service scenarios are services provided based on the urban infrastructure and serve the tourist administrations, the tourist enterprises, the tourists and tourist workers.

The security guarantee system safeguards all parties involved based on the physical network, the system information and management. A precaution mechanism is designed to ensure safe flow of information, ensure confidentiality, integrity, non-repudiation and usability of the information, and avoid potential risks. It provides quality control of projects, standards and policies of the industry to ensure safety of the smart tourism services in an all-round way.

The standardized system is a large and complex system that involves diverse parties and applications, much information exchange and connection of ports. The platform should follow certain technical standards during the design to reduce risks during construction.

The standardization system and security guarantee system penetrate every aspect of the all-for-one smart tourism framework to provide the basis and conditions for development of smart tourism, thereby ensuring safe, reliable and sustained development of the smart tourism industry.

2.2 Design of service workflows

The core of smart tourism is big data and big data-based analysis. Information acquisition and demonstration need support of communication. In a smart tourism framework, the information transfer capacity among different links should be improved. Specifically, the smart tourism big data center, the smart service platform, the comprehensive management platform, the destination marketing platform are built to improve the data collection capacity, the information transfer capacity, information processing capacity, comprehensive demonstration capacity to connect all links in the information flow and provide information at request.

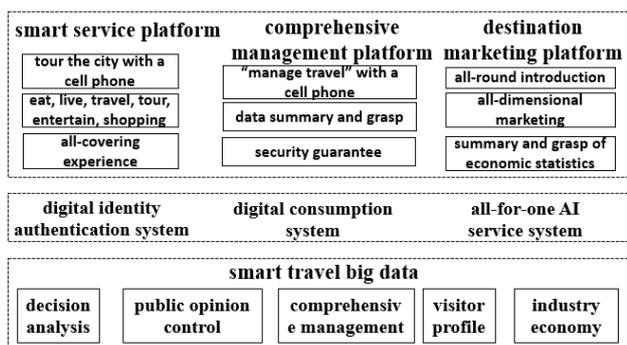


Fig 2. business process design structure

The travel big data center connects with all aspects of the site, including the entrance guard systems, the ticketing system, the traffic network, hotels, vehicles, e-commerce platforms to collect and cleanse data, acquire dynamic data, and provide objective and real-time data for passenger flow detection, vehicle flow guidance, emergency response, travel marketing decision-making. With the introduction of travel data, a travel big data system that is accessible and sustained can be built to realize such functions as data collection, storage, analysis, sharing, and display.

The service platform is a tourist-oriented system that consists of tourist app, WeChat subscription account, applet, travel e-commerce service online appointment, vocal interpretation, positioning.

The comprehensive management platform is to coordinate management of the sightseeing sites, restaurants, inns, tour guides and other parties involved in travelling services. It monitors the operation of the travel industry, responds to over-loading events and emergencies. It also helps with integrated management of the all-for-one tourist resources. With a tourist resource management system and e-travel maps, the users can view the real-time travel data through the mobile app and realize touring the city with a cell phone in hand.

The destination marketing platform is a marketing module that consists of the building of new media matrices, design of customized travelling plans, innovation of marketing campaigns. Also, it improves the products and services of the tourist module based on big data, promote the tourist industry in an all-round manner. With all resources integrated, an integrated marketing campaign can be organized to advance the development of the local tourist industry and create a joint development path for tourism.

The framework of one center and three platforms can provide good experience to the tourists, utilize big data in management of tourism, move towards green tourism, provide monitoring techniques for the tourist industry, improve the monitoring quality as well as the services.

3 Introduction to the functional modules of the platform

3.1 Tourist big data cloud platform

The all-for-one tourism data management center collects and submits all data of the sites including the consumption sum, the consumption preferences, the tourists' features, the traffic conditions, the tourist income, the traffic conditions to realize real-time monitoring of the tourist business, provide a statistical basis for tourist marketing decision-making and upgrading of the tourist industry. The data are submitted by the information systems in the sightseeing sites, the tourists, the tourist management staff, the administrations, the hotels and restaurants, etc.

The big data platform has the following features.

All general functions are uploaded to platforms: one-stop integrated services provide the technical power for transformation of smart tourism, and can be coordinated through a unified port.

The platform is ordered, integrated and innovative: all components of the big data platform are integrated, the smart tourism digital assets are created to improve the power of the tourist industry and diversify the services.

The platform is open, flexible and expandable: the general power of the platform can support different services. The platform is an open platform, flexible and expandable to meet the needs of different customers.

The national codes of industries are followed to create a set of authoritative and implementable information standards, thereby unifying the standards for different applications in the all-for-one tourism system. The standards involve the data management system, the indicator standardization system, the data model system. The data management standards include the meta standards, the code standards, the data transfer standards, which consist of standards for description of data transfer and for data transfer ports.

3.2 Smart service platform

It is feasible to design a unique homepage for the system as per the local features of the sightseeing sites to demonstrate the system, the core functional modules including recommendations, events, live-streaming, e-guide and positioning, online complaints, weather forecasts. With the tourist habits as the focus and the tourists' travelling behaviors as the model, the homepage will allow the tourists to quickly find what they want. The smart service platform actualizes the following functions.

(1) passenger flow guide: the platform can balance the distribution of tourist resources in the area, and guide tourists from hot sightseeing sites to secondary sites and sites of unique features to extend the stay and increase the consumption of tourists.

(2) business authentication. To save the tourists the trouble in finding inns, the platform creates a catalogue of inns, from which the tourists can check the booking records and comments of inns, and submit complaints when they find the inn's services unsatisfactory.

(3) e-maps: e-maps that provide vivid views of the sites proportional to the satellite-captured images are provided to the users with innovative elements to highlight the characteristics of the sites and realize interactions between the tourists and the other systems. The e-maps of the all-for-one tourism can also help the tourist position all kinds of infrastructure and facilities in the site, such as the hotel, travel agencies, restaurants, banks, parking lots, bus stations, gas stations, toilets, etc.

(4) live streaming. The video surveillance systems of different sites are connected to identify the best positions to capture sceneries and display them on the app so that the tourists can sequence the sites as per the type and become more intrigued to visit the sites.

(5) vehicle information inquiry. The tourists can inquire the information of vehicles online, including the contact of the bus companies, the plate number, the service complaint channels, the stations, the starting and ending stations, the bus schedules, the intervals of buses, etc.

3.3 Comprehensive management platform

3.3.1 Business management platform

Businesses that want to enter the e-commerce platform need to register as per a unified set of standards. The businesses upload information for registration, and the supervision staff check the submitted materials. If the materials do not meet the standards, the businesses are rejected with the rejection reasons provided. The business owners can revise the registration materials as per the rejection reasons and re-submit. When the registration is approved, the supervision staff assign stars to the business owners as per their services and products, and then the business owners can start their operations in on the e-commerce platform.

The system also provides ordering and financial management functions to allow business owners to summarize their data of ordering, membership, and products. Results of operation analysis, goods analysis and trading analysis are provided to sustain the business owners' operation.

3.3.2 Industry supervision system

The system can realize unified management of tourist activities, monitoring, early-warning, and passenger flow control. The data collection module collects data from travel-related enterprises, monitors their operations, forecasts the number of tourists so that the enterprises can be better prepared to accommodate the tourists. Modules like video live-streaming, group management, vehicle and ship management are built to perform real-time monitoring of the site and alleviate passenger flows. In this way, the system can perform effective monitoring and management, passenger flow control and improve the tourist service quality.

The major purposes of the system are to capture the operational conditions of travel-related enterprises in real time, find and solve problems. The system consists of six modules, i.e., industry credibility events, credibility monitoring, travel agency and guide credibility evaluation, official authentication and recommendation, tourist industry analysis and complaint management.

3.4 Destination marketing platform

Through unified control and distribution channels, the platform can standardize the products of the destinations, thereby expanding the marketing channels, ensuring tourist satisfaction, improving the brand images. In particular, it alleviates the conflicts in resources between the peak and the lean seasons, and provides precautions for emergencies. The marketing platform is a third-party platform that connects the sites and the distributors, and as a reliable third-party support, the distributor platform provides a controllable distributor management environment, an efficient and secure e-ticket channel, a range of analysis reports for the site to assist in the decision-making of the site.

The marketing platform can generate, deliver, check,

refund the tickets and recollect the vouchers; the distributor platform gathers different distributors to the site. On the platform, the tourists can make appointments or buy tickets, after which they are provided a QR code to enter the sightseeing site or they can get a print ticket from a ticketing machine. In this way, the time for tourists to wait in a queue to buy a ticket is substantially reduced.

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