WTCP

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### Reference
The WTCF Global Report on Smart Tourism Cities is a research project conducted by the World Tourism Cities Federation (WTCF). This project was coordinated by Ms. Huiying ZHANG, Senior Manager of the WTCF and a Member of the Advisory Board of the United Nation’s World Tourism Organization (UNWTO.QUEST). Ms. Esencan TERZIBASOGLU, Special Advisor to the Secretary General of the WTCF and the former UNWTO Director for Destination Management and Quality, and Prof. Yunpeng LI, Specially Appointed Expert to the WTCF and a Professor at the Capital University of Economics and Business, were the chief experts involved who provided their expert guidance and instructions as to the contents of this report.

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Smart tourism is a new practice contributing to the development of tourism throughout the world’s cities. The main purpose of studying these world smart cities is to summarize their successful development of smart tourism. It involves analysis of the major issues concerning the development of world smart tourism cities, and its aim is to promote the healthy development of world tourism cities, as well as to inject new vitality into the sustainable development of world tourism.

The Global Report on Smart Tourism in Cities summarizes the smart tourism construction experiences of six members: Beijing, Chengdu, Madrid, Helsinki, Buenos Aires and Marrakech. It also includes the explorations of two institutional members: Ctrip and Tencent in helping cities develop smart tourism. The report concludes by introducing MIT’s Sensible City Lab’s success in providing technical support for smart city development through their top engineering and mathematical models.

The Global Report on Smart Tourism in Cities evaluates its members’ level of smart tourism development through a questionnaire, and analyzes how smart tourism cities use advanced technologies to improve their level of smart tourism development. This is all done to help enlighten tourism cities about how to construct better smart cities based on their characteristics through case sharing.

The World Tourism Cities Federation (WTCF) is the world’s first city-based international tourism organization. Our core concept is Better City Life through Tourism, and we are committed to promoting cooperation and exchanges among the world’s tourism cities. We have 218 members in 74 countries and regions, covering the entire global tourism industry chain. The WTCF calls on the world’s tourism cities to fully implement technology supporting further development of tourism cities. Our goals are to improve the level of tourism cities’ services, management, and marketing. We aim to speed up the construction of globally influential smart tourism cities, and to deliver high quality and convenient tourism products and services to the world.

We welcome experts and scholars interested in the development of world smart tourism cities to participate in the study by offering their valuable opinions.

Secretary General of the World Tourism Cities Federation
Smart Tourism has gained substantial momentum in urban development policies and strategies for more than a decade through innovation, digital transformation and shared knowledge, creating a better experience for city residents and tourists alike.

By adopting smart initiatives in their tourism strategies, city destinations can build a competitive, sustainable and inclusive tourism industry that contributes greatly to the wellbeing of the local community.

In general terms, Smart Cities are those which have developed smart (intelligent) physical, social, institutional and economic infrastructure while ensuring the centrality of their residents in a sustainable environment. Smart Cities may refer to smart economy, smart mobility, smart environment, smart living and smart governance. Many cities in the world are becoming smarter by addressing the need to enhance the “liveability” and “productivity” of their citizens through remarkable efforts in improving mobility, connectivity, health care and public safety. Smartness is a new paradigm which involves a wider stakeholder engagement, collecting and processing relevant data and use of cutting-edge technologies.

As regards a clear understanding of “smart tourism”, smart destinations generally have the above-mentioned characteristics. Nevertheless, they have also developed strategies to enhance tourism competitiveness by deploying their natural and cultural resources in a sustainable manner, creating innovative products for visitors, hence creating a unique experience for them. Smart destinations obviously take advantage of digital technology and related devices as well as the engaged stakeholders who provide and share knowledge and information all through the destination value chain.

It is quite evident that research is essential to further explore the real scope of smart tourism in cities to clearly understand how this experience is co-created and determine what are the prerequisites and necessary conditions for this technology-enhanced experience.

As the first international tourism organization and the global platform for exchange of experience and expertise focusing only city destinations, the WTCF has been addressing “smart tourism” as an opportunity for its members to make significant efforts to capture this market to be more competitive for Chinese visitors. Due to China’s fast-growing digital culture and the wide use of digital media for communication and interaction in China, millions of Chinese travellers have their specific perspectives and expectations about smart tourism and smart city destinations. Hence the opinions of Chinese tourists (domestic and outbound) can provide an integrated framework of information and recommendations that can serve as a valuable source of strategic knowledge for city destination managers.

It has been globally recognized that China’s fast-growing outbound tourism market has been changing in terms of consumption patterns and selection of destinations, as well as in its products and experiences. Many city destinations have made significant efforts to capture this market to be more competitive for Chinese visitors. Due to China’s fast-growing digital culture and the wide use of digital media for communication and interaction in China, millions of Chinese travellers have their specific perspectives and expectations about smart tourism and smart city destinations. Hence the opinions of Chinese tourists (domestic and outbound) can provide an integrated framework of information and recommendations that can serve as a valuable source of strategic knowledge for city destination managers.

As the first international tourism organization and the global platform for exchange of experience and expertise focusing only city destinations, the WTCF has been addressing “smart tourism” as an opportunity for its members to
deliver innovative approaches and technology solutions for enhancing their competitiveness, sustainability, branding and positioning within its overall vision of “Better City Life through Tourism”.

WTCF 2019 REPORT ON SMART TOURISM IN CITIES has been conducted by collecting quantitative and qualitative data, based on the identified key performance areas, from the member cities which voluntarily participated in the research as well as from a few private institutions and companies related to the topic and/or to the Chinese tourism market.

The results of the study not only can help the cities elaborate relevant assessment criteria/indicators under the defined KPAs but also provide them with basic guidelines to identify the areas where to improve, set performance benchmarks and make their destinations smarter, more sustainable, competitive and liveable for both visitors and citizens.

Methodology and key findings:

The WTCF has identified the following four Key Performance Areas (KPAs) on which the assessment of the scope of smart tourism initiatives in participating cities are based. The success stories from several cities are also presented by taking into consideration the following classification:

1) Data collecting, data analysis, smart applications for research
2) Smart solutions for sustainable cities (environmental, cultural and economic sustainability)
3) Smart tourism tools
4) New business models and innovative mechanisms

I. Collecting quantitative and qualitative data at city level:

Based on the KPAs, a survey has been conducted to obtain qualitative information from the WTCF member cities on the level and scope of smart initiatives directly and/or indirectly related to tourism. 36 cities representing Africa, Americas, Asia Pacific and Europe responded to the survey questionnaire and briefly explained the already launched and/or on-going projects/initiatives as regards “smart tourism” in their cities.

Given the importance of market intelligence many leading cities have established a solid institutional structure to create strategic information and knowledge for tourism development and management, and in the meantime, assess customer behaviour for a high-quality visitor experience. Tools such as Big Data and Open Data form the skeleton of Smart Tourism, and thanks to these cutting-edge technologies, a visitor’s digital footprints can be traced to better identify customer patterns, needs and behaviour. Cities also use other sources for market intelligence, and some have adopted data driven customer management.

In general terms, sustainability measures which affect tourism management in cities are incorporated in the municipal strategic planning process, and many cities have either launched or included sustainability projects in their urban development plans related to biodiversity management, waste management, fresh water management, renewable energy, soft/smart inter-urban transport, and public transport accessible to people with disabilities. In many cities the tourism sector is engaged in this process. Some cities continuously improve the visitor experience through innovative tourism products. Crowd management has been a serious issue for several cities and digital technology is being effectively used to monitor and minimize the negative impact of this phenomenon on residents and visitors. This also applies to traffic management, and especially to vehicle parking. Many cities have already embarked on new technologies to measure and monitor environmental impact. It is now possible to measure the “tourism carbon footprint” through an indicator system along with other measurement tools for air quality, water quality, noise, solar radiation, seismic risks, etc.

The tourism industry, especially the accommodation sectors in cities have adopted and continuously improved the free WiFi connection for their customers. Nowadays, free WiFi is not only available in hotels and restaurants, but likewise, many cities offer internet access in public space like parks, shopping malls, airports and other transport terminals.

The new age of information technologies has opened a new path for the tourism sector through which mobile hardware, software and networks facilitate interaction among visitors, stakeholders, tourism products and services on the spot. These smart tourism tools have become key instruments to provide real-time information and personalized access to products and services at destinations, such as bookings, ticketing, interactive maps, audio guidance, translation, cashless payment, use of local amenities and other niche applications. Virtual Reality (VR) devices, Near Field Communication (NFC) devices have been put into place at many leading city destinations.

To make the new technology tools user-friendly and efficient, it is quite important to increasingly engage the public and
private tourism stakeholders about these digital platforms. Many cities are putting a lot of effort into the digital transformation of the entire tourism value chain.

The survey has also addressed that new business models and innovative mechanisms directly or indirectly related to tourism and with digital public content, have been launched at the municipal level in the areas of information, transport, climate, safety and security, public health, etc. Likewise, a wide array of digital platforms enable businesses to have direct access to the market, hence vastly expanding their customers’ choices. This phenomenon has created a powerful and dynamic ecosystem in which service providers and customers directly interact in commercial terms, and in the meantime the related industries can re-shape their business models and invest in innovation. In many of the WTCF member cities, quite a variety of social media platforms and other commercial applications are operational regarding information, bookings, transport services, food delivery, car sharing, cashless payment, ticketing and city tours.

In order to meet the needs and the expectations of the fast-growing Chinese market, many of the participant cities have analysed the particularities of this market together with their consumption patterns (especially their digital culture) and launched initiatives to bring Chinese customers to their destination. We Chat, Alipay, Weibo, and UnionPay can all be used by Chinese visitors in many cities who joined the survey. Ctrip along with other companies effectively collaborate with the city destinations to offer a unique experience for Chinese customers. Many cities have already launched their own tourism websites in Chinese.

The survey also obtained information about safety and security as well as health insurance conditions for visitors. The results have shown that the issue of “tourist health insurance” has not been adequately mainstreamed by most of the cities and might perhaps be a policy concern of the central/regional governments.

2. Showcasing success stories:

Six WTCF member cities, (Beijing, Buenos Aires, Chengdu, Helsinki, Madrid and Marrakesh) representing different geographical regions worldwide, participated in the study by showcasing their success stories on one or two of the above mentioned KPAs and on how they apply “smart tourism” at their destinations. International experts assigned by the WTCF Secretariat realized field visits and interviewed the main stakeholders on the spot to obtain reliable data and hence evaluated the findings that have provided useful insights about good practices. The successful case highlights are as follows:

Beijing (China):

Beijing defines its core theme of smart tourism development as “innovation”, “sharing” and “quality”. Smart tourism has been a policy priority at the urban destination level and the municipal government has launched a series of development and action plans beginning in 2012 by focusing on the use of AI (Artificial Intelligence), Big Data, and cloud computing. Likewise, shared inter-urban vehicles, 5G technology, virtual reality, and augmented reality are the new innovative instruments related to tourism.

Buenos Aires (Argentina):

The city of Buenos Aires has launched several initiatives to develop data collecting and data analysis procedures, particularly for the areas of urban management, environmental management, and tourism management. The city attaches utmost importance to sustainability issues and has developed smart strategies to improve the quality of life of its residents while maintaining its tourism competitiveness and the conservation of its natural, cultural, and historical environment. Buenos Aires has put in place a very effective “Tourism Intelligence System” which aims at generating strategic information about the current and potential customers (visitors) and guiding the public and private tourism stakeholders in their decision making. This scheme helps to strengthen tourism governance as well as the city’s competitiveness and positioning.

Chengdu (China):

Chengdu is making significant efforts to reinforce its brand with new developments for a “smart city”. Tourism also benefits from those projects which target the broad use of digital technologies such as IoT (Internet of Things), cloud computing, AI (Artificial Intelligence) and Big Data. Chengdu increasingly facilitates smart applications so that its visitors enjoy a high quality and unique experience. A variety of smart devices have been introduced to be used in public places for interactive tourist information, and likewise cashless payment schemes are highly developed. Tourism governance at the city level is in the process of being digitalized.
Helsinki (Finland):

The Helsinki City Strategy has identified “digitalization” as one of its development and management priorities within the context of the city vision for 2017-2021. To provide access to regional information the city of Helsinki successfully set up the Open Data ecosystem, which has enabled transparency in public administration and created new digital practices for new product designers. My Helsinki Open API is an excellent example of a smart tourism initiative within this context which provides comprehensive information about the attractions and activities around the city. MyHelsinki.fi website is based on content and recommendations by locals and is also an efficient tool for reliable and genuine information about the city’s attractions. Many other digital platforms have been introduced to enhance visitors’ experience at destinations. Helsinki is one of the leading cities which has set forth substantial long-term goals regarding sustainability at the city level.

Madrid (Spain):

In recent years, Madrid has adopted smart initiatives by addressing the need for enhancing the liveability and productivity of its citizens through substantial efforts in achieving better connectivity, mobility and sustainability. Within this context, the tourism sector has also benefited from those initiatives and has introduced smart tools, digital platforms and new business models to improve the quality of visitors’ experience as well as to better perform in a competitive environment. Some of the operational smart initiatives coordinated by the “tourism intelligence centre” involves the use of Big Data, real time data, social networks, electronic booking records and open data, all contributing to market intelligence. Additionally, Madrid has introduced sustainability measures at the municipal level such as soft interurban transport, accessible transport (for people with specific requirements), biodiversity management, and congestion management. The successful showcase of Madrid in this report represents a smart marketing tool called “Vuelve a Madrid/ Come Back to Madrid which is the first loyalty program for a destination. The initiative is based on a public/private partnership model and is pro-active with the customer/visitor through a digital platform.

Marrakesh (Morocco):

Marrakesh is quite keen on converting the city into a “smart tourism destination”. Sustainability is one of the key priorities of the local authorities as well as representatives of the tourism sector. The central government fully supports the strategies, action plans and projects put into place by the municipal government, such as “green key label”, water management, environmentally friendly urban transport (e.g. Medina Bike), and renewable energy. Marrakesh has also witnessed a significant digital transformation, especially in public services such as telecommunications, due to the launch of a wide network of corresponding infrastructure. The tourism sector has obviously benefited from the digital eco system, and a lot of digital platforms and new technology tools have been integrated in the destination management process such as Open Data, e-invest platform, information platform (My Cop 22) and Marrakesh Pass.

Along with the above showcased cities, a few companies/institutions also collaborated with the study and presented their findings on “smart tourism” like MIT-Sensible City Lab (USA), Ctrip (case study for Guiyang, China) and Tencent, (case study for the city of Kunming, China).

3. Collecting data and information from Chinese customers:

This section of the report evaluates the level of “smart tourism” in cities (in China and abroad) visited by Chinese tourists and analyses their experiences and perspectives as consumers. Data is collected from different tourism operators such as Ctrip, U-tour and Caissa and is based on the surveys conducted among their customers. The results clearly indicate that Chinese customers have at least baseline expectations with respect to the availability of smart devices and smart applications for tourist information, e-guide, ticketing, mobile payment (especially Alipay and WeChat) and wi-fi coverage at the destinations they visit. The needs, expectations and level of satisfaction largely vary depending on the visited destination (i.e. domestic or international) and type of travelling (i.e. self-guided or organized/escorted tour).

The WTCF REPORT ON SMART TOURISM IN CITIES (2019) clearly shows that the principles of “smart tourism” lie in enhancing tourism experiences, improving the efficiency of resource management, maximizing tourism competitiveness and ensuring benefits for the whole society.
An important dimension for measuring the development level of smart tourism in cities is the subjective evaluation of its users. The purpose of this report is to investigate tourists’ evaluations of the level of smart tourism in the cities they have visited from the perspective of users (demanders) of urban smart tourism. This tourist demand survey is divided into two parts. Some of the questionnaires were distributed through WeChat Moments on March 30, 2019 and were collected on the same day; these questionnaires were used to collect the comments and suggestions of mainland Chinese tourists on smart tourism in Chinese cities; most of the cities selected are members of the World Tourism Cities Federation, and a few are leading cities of smart tourism in China. The remaining questionnaires were distributed to tourists by Ctrip, U-tour, Caissa and other outbound tourism enterprises through outbound tour leaders from May 29 to June 11, 2019. The purpose is to investigate the evaluation of Chinese tourists on the development of smart tourism in five overseas cities. Both parts of the survey are supported by wenjuan.com.

Chinese tourists’ evaluations of the development of smart tourism in overseas cities

The data in this part are from the tourist questionnaire survey.

Analysis of characteristic data in tourist demography

According to the results of the questionnaire survey, 60% of the respondents are traveling in tour groups. Among the respondents, 50% have a monthly income of more than 10,000 yuan, 50% are aged 35–44 and 70% have a bachelor’s degree, and the average length of stay is 3.5 days (see Figure 1).

1. Marrakech

Marrakech is a strange city to many Chinese tourists, so the tourists surveyed traveled in tour groups and stayed for an average of 3 days. The city mainly attracts the youngest group of tourists (25–34 years old; absolute proportion of 3.33%) with a relatively low income (5001–8000 yuan/month). The survey results show that Marrakech as an emerging tourist destination has a strong appeal to young tourists (see Figure 2).

2. Madrid

Among the tourists to Madrid surveyed, 50% traveled in tour groups and 50% in self-guided tours (absolute proportion of 20% in the respondents respectively). Madrid is a mature tourist destination for Chinese tourists. The tourists surveyed who have visited Madrid are of all ages and educational levels. Self-guided tourists account for a relatively large proportion. The average length of stay is 4.08 days (see Figure 3).

3. Helsinki

Helsinki has the highest proportion of self-guided tours (13.33%). The monthly income of 1,001 to 20,000 yuan accounts for 71.43%. All age groups are present and...
the highest proportion is 35–44 years old (10%). The proportion of bachelor's degree is the highest (13.33%). At present, the specific reason is unclear, but a possible explanation is that Tencent has developed APPs for Chinese tourists in Helsinki which makes travel easier for self-guided Chinese tourists (see Figure 4).

4. Buenos Aires

Among the respondents who traveled to Buenos Aires, those with a monthly income of more than 20,000 yuan account for 2/3 of all respondents, indicating that Buenos Aires, as a long-distance tourism destination, appeals more to high-income groups. These people mainly have a bachelor's degree, are aged 35–44, and spend an average of 2.67 days in Buenos Aires (see Figure 5).

5. Wellington

Wellington is a destination for long-distance tourism. According to the survey, escorted tours have become the main choice of tourists. Respondents mainly have a monthly income of more than 10,000 yuan (absolute proportion of 71.43%), a bachelor's degree (absolute proportion of 13.33%), and are aged 35–44 (absolute proportion of 35–44 years old, indicating that Wellington is popular among high-income groups aged 35–44. (Figure 5)
The average length of stay is 3.29 days (see Figure 6).

Comparative analysis of escorted tour and self-guided tour data

1. Comparison between escorted tours and self-guided tours (see Figure 7)

Self-guided tourists rate tourism elements and transportation services higher than escorted tourists, which is consistent with the characteristics of outbound tourism where the proportion of self-guided tours increases year by year. It also indicates that group tour services need to be optimized and improved.

Self-guided tourists have a higher evaluation of the smart services of tourist attractions than escorted tourists. This is especially evident for self-guided tourists, who rate much higher than escorted tourists in VR/AR experience (5:3) and touch screen in scenic areas (5:3.5).

In terms of network service, self-guided tourists and escorted tourists give a similar rating of 4.5 points.

In terms of smart services at museums and cultural centers, self-guided tourists' evaluations of most options is higher than (including VR experience and QR code) or equal to (including digital collections and electronic tickets) that of escorted tourists. But in terms of e-guide and touch screens, the rating of escorted tourists is higher than that of self-guided tourists, being 4.57:4.14 and 4.5:4.0 respectively.

2. Analysis of self-guided tour data (see Figure 8)

According to self-guided tour data, 43.48% of the respondents pay by bank card, which is quite different from the proportion of 13.33% absolutely. The average length of stay is 3.29 days (see Figure 6).
domestic situation; this is mainly due to the low popularity of Alipay and WeChat Pay in overseas cities (except Helsinki). Respondents chiefly book tickets for tourist attractions (accounting for 24.39%) on online platforms, with lower proportions of shopping and local event reservations (4.88% respectively). The three dimensions (accuracy, richness and convenience) of traffic information service are all highly rated (averaging about 4.5).

In terms of information inquiry modes, telephone counseling receives the highest rating but is less frequently used (4.76%), map service has low ratings (4.25, 4.38, and 4.50) but is frequently used (38.10%), and the official websites of cities have a medium rating.

The three information dimensions (richness, truth/accuracy, and convenience) of the online reservation platform are rated between 4.4 and 4.6, which are not too high. Reservation service is rated between 4.38 and 4.63. The respondents use urban reservation platforms (52.94%) more than service providers (47.06%).

3. Analysis of escorted tour data (Figure 9)

Most reservations and arrangements for escorted tours are made by travel agencies, and tourists themselves only use a city’s smart services in certain circumstances. Therefore, this portion of the questionnaire...
is different from that of the self-guided tour section. The results of the survey show that the respondents are relatively satisfied with the information services provided by the third-party platforms (5.0), but they rate the official information relatively low (4.82 and 4.4). This indicates that escorted tourists require less depth information, so the destination's depth information is not really applicable to escorted tourists. However, tourists are still highly dependent on the official channels of the destination (65.93% and 18.68%). The respondents are highly satisfied with food information (30.61%), while they are least satisfied with the shopping information (18.37%).

**Chinese tourists’ evaluations of domestic cities**

This data is from the tourist questionnaire survey and the reservation data on ctrip.com.

**Overview of the survey**

70.42% of the tourists surveyed are not engaged in work related to smart tourism (tourism, cloud computing, AI, mobile communications, etc.). Among the 16 cities covered, Beijing, Hangzhou, Chengdu, Xiamen and Guangzhou are the top five smart tourism cities in the minds of respondents (see Figure 10).

In regards to respondents’ impressions of the transportation services in the selected cities, multiple response analysis shows that “convenient public transportation such as buses and subways” accounts for the largest proportion (23.70%), followed by “accurate, efficient and convenient traffic information inquiry at tourist attractions”,...
accounting for 18.3%, and “accurate, efficient and convenient operation of urban traffic information inquiry system”, accounting for 18.1% (see Figure 11).

In terms of effective help for tourists (food, travel and shopping and navigation guides), tourism WeChat official accounts and APPs provide effective help for tourists (such as information about food, travel and shopping and navigation), followed by traffic information service systems and smart tourism APPs (see Figure 12).

The respondents mainly book hotels, scenic spot tickets, tourist transportation and catering services through online reservation platforms. The proportion of tour guide service and local event reservation is relatively low, which may be related to the demand of tourists and the operation focus of the services provided by online reservation platforms (see Figure 13).

During the tour of tourist attractions in cities, tourists have experienced such smart tourism services as mobile payment, electronic tickets, Wi-Fi coverage at tourist attractions, and electronic guide maps. But the proportion of tourists who have tried online souvenir ordering and VR/AR experience is relatively low. It reflects the development status of smart tourism at current tourist attractions (see Figure 14).

Thirty cities were selected as the control group in the questionnaire survey. In terms of the mentioned cities and frequency, the top three are Shanghai (17 people), Xi’an (8 people) and Suzhou (4 people). The respondents believe that Shanghai has the best experience in smart tourism construction results mainly for the following reasons: subway and bus inquiry system, real-time heat map of tourist attractions, user-friendly QR codes, transportation, intelligent transportation, accommodation reservation, cashless payment, online booking, many high-tech applications, mobile payment, and provisions for information and traffic accessibility at tourist attractions. It’s believed that the main reasons for the good experience of smart tourism construction results in Xi’an are as follows: museum audio guide, audio guide reservation, excellent online marketing, protection of historical relics and intelligent transportation. The main reasons for the better experience of smart tourism construction results in Suzhou are as follows: smart tourism APP, combination of cultural history and the natural environment, transportation, tourist facilities and scenic spot services. See Table 1 for the evaluation dimensions for other cities.

**Comparative analysis of city groups**

Tourists most recognize the level of smart tourism in Beijing, Hangzhou and Chengdu in the first control group, accounting for 44.37%, 19.72% and 8.45% of the respondents respectively. VR experience, Wi-Fi coverage, e-guides, electronic tickets, touch screens at tourist attractions, mobile payment and audio guides are the most impressive experience items for tourists. In the second control group, Shanghai enjoys the highest recognition in terms of museum audio guides, tour guides, transportation services, subway and bus inquiry, e-guide, etc. (see Figure 15).
Analysis of questionnaire survey results for two case cities

1. Beijing

Tourists are deeply impressed by the smart tourism services such as mobile payment, electronic tickets, e-guides, Wi-Fi coverage, audio guides and touch screens at tourist attractions, reflecting Beijing’s achievements in the implementation of the four standards for smart tourism set forth in 2011. Tourists are not much impressed by the intelligent parking system and VR experience at tourist attractions. Booking tickets and hotel reservations, and catering, tourism, transportation, culture and art performance booking services on online reservation platforms are all highly rated, which indicates that Beijing, an ancient capital of historical and cultural significance, has been relatively mature in the reservation of travel-related basic services. In addition to the government information platform, there are many services provided by large enterprises, such as Ctrip, Qunar, Meituan, piaowutong.com, etc.

According to Ctrip’s data for the first quarter, the post-70s and post-80s generations are the main tourists to Beijing (together accounting for 68%); escorted tours account for 63.85%; the main modes of travel are aircraft (27.15%) and high-speed trains (30.56%); tourists staying for 1~3 days account for 83.09%, and tourists booking 4- to 5-star hotels account for 78.17%; spending on train tickets, hotels and air tickets account for 50.62%, 24.63% and 19.1% respectively. In terms of per capita consumption, tourists from Guangdong rank first at 1208.07 yuan; Beijing natives and the tourists from Shanghai and Zhejiang have a per capita consumption of more than 900 yuan (934.38, 926.71 and 905.33 yuan respectively). The most popular tourist attraction is the Forbidden City (61.85%) and the most popular tourist area is Chaoyang (28.84%).

In terms of help for tourists from information platforms, WeChat official accounts, transportation service, Weibo, WeChat and official information websites provide nearly flawless information about food, housing, transportation and shopping. Urban transportation service generally receives high ratings, while traffic jams and non-mainstream transportation service receive low ratings.

2. Chengdu

Mobile payment and electronic ticket booking in Chengdu are the best experience items for tourists, followed by e-guide and WiFi coverage. Touch screens at tourist attractions account for 7.5%. Audio guide and online shopping account for 5% respectively. VR experience and intelligent parking account for 2.5%. Tourist

Table 1  Features of Smart Tourism Construction in Cities

<table>
<thead>
<tr>
<th>City</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changzhou</td>
<td>Convenient information and high degree of intelligence</td>
</tr>
<tr>
<td>Nanjing</td>
<td>Convenient transportation and detailed guide maps at tourist attractions</td>
</tr>
<tr>
<td>Lijiang</td>
<td>Promotion of traditional culture and application of modern information technology</td>
</tr>
<tr>
<td>Guilin</td>
<td>Intelligent identification of the Internet of Things</td>
</tr>
<tr>
<td>Shenzhen</td>
<td>Convenient and fast transportation; considerate online reservation service for accommodations</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>QR codes at bus stops for real-time inquiry of arrival time and other information</td>
</tr>
<tr>
<td>Sanya</td>
<td>Convenient transportation and proper market regulation</td>
</tr>
<tr>
<td>Yunnan</td>
<td>Travel APPs can integrate most tourism resources and products into one platform.</td>
</tr>
<tr>
<td>Dunhuang</td>
<td>There’s a special way to buy tickets in Dunhuang. Tourists can acquire tickets for the day when they arrive at the Dunhuang area (within 30 kilometers around the Mogao Grottoes). Tickets for the Mogao Grottoes are limited. If tourists don't book online in advance, the only way is to get tickets around the tourist attractions. And they are not necessarily available.</td>
</tr>
</tbody>
</table>

Figure 15  Comparison of smart tourism between two city groups

![Comparison of smart tourism between two city groups](image)
attractions, tickets, hotels and transportation are the top three items on online tourism platforms, followed by catering and performance tickets, and finally local events and tour guides, accounting for 2.94% respectively.

With respect to the impression of urban transportation, subway and bus information inquiry, internal transportation at tourist attractions and railway traffic information inquiry rank first; flight on-schedule rate and urban traffic information inquiry rank second; consumption information of tourist attractions and travel reservations account for 3.45% respectively, ranking third.

According to Ctrip’s data for the first quarter, tourists to Chengdu mainly come from Sichuan Province, accounting for 43%, followed by tourists from Beijing, Guangdong and Shanghai. Self-guided tours account for 47.48%; tourists staying for 1–3 days account for 86.33%, and tourists booking 4- to 5-star hotels account for 90.74%; spending on train tickets, hotels and air tickets rank among the top three, accounting for 48.64%, 26.03% and 14.05% respectively. Tourists from Shanghai, Guangdong, Jiangsu, Liaoning, Zhejiang and Shandong have a per capita consumption of more than 800 yuan. The most popular tourist attractions are Xiling Snow Mountain (37.71%), Chengdu Research Base of Giant Panda Breeding (21.11%) and Chunxi Road (17.42%). The most popular route is from Chengdu to Mount Emei/Leshan (see Figure 17).
To better understand the smart tourism construction process in cities all over the world, this quantitative as well as qualitative question survey (see the full survey in the appendix) has been sent to WTCF member cities. The following analysis is carried out according to the 37 questionnaire responses which demonstrate outstanding smart tourism practices globally. As the analysis results are strictly based on the questionnaire answers, they may not be representative of all WTCF member cities.

37 cities participated in this survey including:

24 European cities including: Zurich (Switzerland), Riga (Latvia), Belgrade (Serbia), Barcelona (Spain), Seville (Spain), Madrid (Spain), Brussels (Belgium), Varna (Bulgaria), Helsinki (Finland), Budapest (Hungary), Dresden (Germany), Hamburg (Germany), Berlin (Germany), Moscow (Russia), Irkutsk (Russia), Florence (Italy), Turin (Italy), Milan (Italy), London (England), Nicosia (Cyprus) Hague (Netherlands), Yerevan (Armenia), Nur-Sultan (Kazakhstan) and one additional city that would like to participate anonymously.

3 Asian cities including: Penang (Malaysia), Petra (Jordan) and Macao (China).

5 cities located in South America: Lima (Peru), Bogota (Colombia), Buenos Aires (Argentina), Belo Horizonte (Brazil) and Cumana (Venezuela).

1 city from North America: Ottawa (Canada).

3 African cities: Marrakech (Morocco), Cape Town (South Africa) and Nairobi (Kenya).

1 city from Oceania: Wellington (New Zealand).

More than half of the participated cities (24) have established institutes for a tourism intelligence system (Q1.1):

Some city governments that have organized institutes include Belgrade (Belgrade City Statistics Bureau), Barcelona (The Observatory of Tourism; The department of Opinion Surveys at Barcelona City Council), Seville (Smart City Project of the Seville City Council), Budapest (the Hungarian National Tourism Agency), Moscow (The IT department of Moscow Government), Cumana (The Municipal Institute of Statistics), Buenos Aires (Touristic Observatory), Belo Horizonte (Touristic Observatory as well as city website and apps), Madrid (Tourism Intelligence Centre), Hague (National Data Bureau), and Macao (Tourism Information Interchange Platform).

Other cities use multiple sources to collect tourism data including Brussels (city website, social networks, museums and attractions, guides, tourist information centers, Economics Ministry, etc.), Varna (tourist information centers, city website, apps), Helsinki (Google analytics, surveys), Nairobi (tourist information centers, city website, apps, social media), Cape Town (tourist information centers, attractions, airports, hotels and various reports), Milan (the Region is entrusted with collecting official tourism data while the Police, the city information call center and others sources are used), Ottawa (accommodation occupancy, card expenditure and retail data, arrivals information, social media and traffic flow data), Nur-Sultan (Committee of Statistics), Berlin (data from state offices, visitor counts, app CMS and mobile).

Data collected have been used for: tourism, traffic management, event management, accessibility as well as mobility, security (Seville); guest arrivals and guest nights (Budapest); crowd management (Florence); strategic planning (Cape Town); attraction revenue evaluation, tourists analysis and customization, flight and hotel reservation management, crowd management (Buenos Aires); marketplace condition analysis (Bogota); tourist profile analysis, strategic planning (Belo Horizonte), guide their national and international strategies (Madrid), provide data support for planning and development (Macao).

In terms of the market intelligence tools used by cities (Q1.2):

19 cities have used big data, including Zurich, Riga, Barcelona (tourist...
characterization and profiles), Seville (specialized software and standardized methodology from Seville City Council, data collected including traffic, lighting and parks), Brussels, Varna, Budapest (visitor surveys, Budapest Card users statistics, business analysis provided to B2B sectors), Moscow, Florence, Yerevan, Buenos Aires, Belo Horizonte, Berlin (mobile data projects), Milan (social networks, mobile phone providers, credit card operators), Hague, Macao (tourism information interchange platform), Ottawa (transportation, accommodation, attractions and postal codes), Wellington (co-operative group between the City Council, Hospital, Ambulance Service, Police and social/health agencies).

20 cities used open data, including Riga, Belgrade, Barcelona (use the scores from online tourism platforms to evaluate reputation of accommodations, restaurants and attractions), Seville (panoramas and mobile mapping software), Brussels (mobile phone data for influence of events), Moscow (cellphone based data for tourist flow management), Florence (use machine-learning algorithms to understand the mobility patterns of tourists, identify the different types of tourists and marketing), London, Penang (basic market insights), Nicosia (visitor amount and purposes gathered from surveys), Nairobi (public tourism information), Marrakech, Buenos Aires (data on market trends and visitors’ behavioral habits impact tourism development positively by taking effective data drive decisions), Bogota (fostering innovation and improving the visitor experience in our destination), Belo Horizonte (surveys for carnival management, mobile technology resources, the Open Data Portal to public municipality information), Irkutsk, Hague, Wellington (use a Market View system to draw down card expenditure data), Nur-Sultan (survey) and Zurich (data platforms concerning tourism as well as population, living and constructing, leisure, mobility, government, environment).

6 cities adopted data driven customer management, including Zurich, Seville, Nairobi (employing a customer centric approach in the way business is conducted), Cumana (data collected in the tourist capitation centers), Lima (develop tourism products and marketing strategies based on the requirements of tourists), Hague

9 cities mentioned other market intelligence tools, including Brussels (interactive barometers for all the results), Dresden (monthly tourism development reports; individual market research projects), Moscow (Sociological surveys), London, Cape Town (research reports), Bogota (the Touristic Observatory), Turin (Hotel Observatory monitoring) and Berlin (interactive barometer, individual market research projects, trend reports quarterly and research projects).

Overall summary of responses throughout the questionnaire

The survey asks 14 quantitative questions that utilize five-option Likert scales. Each question measures one aspect of the smart tourism construction. The respondents indicated their city’s progress by choosing from 1 (almost undeveloped) to 5 (well developed).

Looking at the responses as a whole (Figure X), the smart tourism facilities with the highest scores are tourism facilities with free WIFI connections, internet access and public spaces with free WIFI connections. The areas which are relatively undeveloped at the moment are water management, renewable energy and technology embedded environments. It should be pointed out that due to the low number of returned questionnaires, the outcome of the survey is not representative of all the WTCF member cities.

Figure 1  Summary of responses
Biodiversity management (Q2.1)

The average score is 3.722.

Florence integrates sustainable development into world heritage conventions; projects include Florence Greenway and the River Arno and Climate Change. Nairobi and Marrakech manage their tourism sectors in a sustainable fashion. Cape Town established management plans for parks and reserves. Cumana have recovery plans for their duck lagoon. Buenos Aires is implementing strategies to increase recycling capacity (through a comprehensive waste management policy), and to increase green infrastructure and sustainable construction. Belo Horizonte is conducting a Strategic Environmental Assessment. In Ottawa, sustainability measures have been incorporated into the municipal strategic planning process. Wellington city supports attractions such as the Eco sanctuary Zealandia as well as programs such as Predator Free Wellington, Project Halo, Project Kiwi and community afforestation. Nur-Sultan established a “project office” aiming for joint collaboration and cooperation on different plans and projects with the involvement of several state and non-state authorities.

Cities that marked 5: Zurich, Seville, Petra, Buenos Aires, Belo Horizonte, Milan, Hague (7 in total)

Waste management in the tourism sector (Q2.2)

The average score is 3.444.

Recycling is emphasized by many cities including Zurich, Barcelona, Florence, Nicosia, Ottawa, Nur-Sultan and Berlin.

Budapest is rewarded in the green hotel sector. London is working with the hospitality industry and hosting events associated with climate change. Penang practices waste segregation in its shopping malls, hotels and households. Nairobi’s central business district has been separating different types of waste and it has mostly been adopted by their big tourism establishments. Cape Town encourage tourism enterprises to achieve the Fair Trade Tourism certification.

Cities that marked 5: Zurich, Varna, Hamburg, Florence, Madrid, Milan, Hague (7 in total)

Sustainable freshwater management (Q2.3)

The average score is 3.000.

Many European cities are working to provide drinkable fountains at a city level, including Zurich, Barcelona, Florence, Milan and Budapest. Penang has a rainwater harvesting system. Nairobi pointed out that most of their tourism establishments have access to fresh water but very few use recycled water. Cape Town's households and businesses have installed water saving devices.

Cities that marked 5: Zurich, Helsinki, Yerevan, Hague (4 in total)

Renewable sources (Q2.4)

The average score is 3.139.

The Zurich Tourism office consumes 100% renewable energy and the city allows organizations and households to choose the energy product on a voluntary basis. Barcelona established a study about its Carbon Footprint. Moscow’s bike sharing system is powered by solar energy stations. Florence offers financial aid to those enterprises who want to make their offices more energy efficient. Several tourism businesses in Nicosia have applied for financial support provided through the "Plan for renewable electricity production for own consumption". Petra, Cape Town and Marrakech encourage solar energy. Almost all tourism establishments in Nairobi consume energy from renewable sources. Wellington’s electricity is currently 85% from renewable sources and the city has invested in Solar Virtual Powerplants, neighborhood energy schemes and utilize the city's abundant wind resources.

Cities that marked 5: Zurich, Helsinki, Yerevan, Hague (4 in total)

Smart inter-urban transport facilities (Q2.5)

The average score is 3.676.

Bikes are encouraged in many cities including Zurich (e-bikes), Barcelona (e-bikes), Seville, Helsinki, Florence, London, Penang, Marrakech, Cape Town (e-bikes), Cumana, Lima, Bogota, Belo Horizonte and Nur-Sultan (e-bikes). Berlin offers bikes, e-bikes, car-sharing and e-scooters as public city service for charge. Budapest and Moscow have e-bikes, e-rollers and e-buses. Nairobi developed pedestrian walkways to encourage cycling and walking. Nairobi and Lima introduced periodical car free days. Buenos Aires privileges the mobility of pedestrians, non-motorized modes and public transport, over private vehicles. Milan has a very wide and successful bike-sharing and car sharing system, in the meantime, some of the cars are hybrid or electric. Ottawa incorporates smart transport facilities including EV charging, bike shares and rental, extra parking and ease of access for bikes. Wellington has a large system of walking and mountain biking tracks which contribute to the city's high quality of life and tourism offerings. Nicosia has developed pedestrian walkways that give people the opportunity to have a
more qualitative life by walking or cycling. Nicosia has a service of mini buses offered free of charge that allows people to move around the city.

Cities that marked 5: Seville, Budapest, Hamburg, Moscow, Florence, Madrid, Milan, Hague (8 in total)

**Accessible public transport (Q2.6)**

The average score is 3.811.

Barcelona and Florence offer readily accessible buses, underground subways and trains. Budapest has accessible buses, sidewalks, pedestrian crossings and public transport data. Moscow improved its subway and taxi service. London is improving its stations. Belo Horizonte adapted taxis and implemented signage with audible warnings assist. Ottawa has a dedicated transportation service for those with disabilities and the regular transportation network has buses which also cater to those with disabilities.

Cities that marked 5: Riga, Barcelona, Seville, Helsinki, Dresden, Florence, London, Penang, Belo Horizonte, Hague (10 in total)

**Strategic plan for innovative tourism products (Q2.7)**

The average score is 3.600.

Florence launched Firenze card, Destination Florence and Digital Fun (developers of the Firenze Game app). London is a city of creative people and enterprises and innovation is encouraged and supported--live experiences, VR/AI, festivals, music and cultural events. Penang has projects Gravityz. The habitat Penang Hill and Entopia. Cape Town targeted specific markets such as Khayelitsha (a township in Cape Town) route development and the Halal campaign, highlighting the destination as a Muslim friendly city. Buenos Aires’ InnovaTur BA project has benefited more than 1500 tourism organizations through different actions, offering spaces for the transmission of knowledge and instances of inspiration, participation, reflection and creation of networks for the co-creation and construction of continuous learning. Belo Horizonte’s innovation projects include ‘Pedaling through the Walls’, ‘Invisible Sights’, ‘Paths of Art and Mining history’, ‘ Mines Saws and Flavours’, ‘Mundo Gira Giramundo’, ‘Tambor Mineiro - music and rhythm’. Ottawa continues to strive to facilitate innovative tourism products and experiences that reflect the cities sense of place through festivals, events, conventions, conferences and local tourism enterprises. Nur-Sultan launched an innovation development and technology office, Astana Innovations, which is accountable to the Mayor’s office.

Cities that marked 5: Zurich, London, Penang, Ottawa (4 in total)

**Sensors for parking lots, traffic systems (Q2.8)**

The average score is 3.189.

Zurich has sensors for parking lots, apps for parking lots, and one of the best public traffic systems worldwide in terms of information and punctuality. Seville rotates car parks in the Blue Zone to avoid long parking times. Budapest’s Cities4People-Towards People Oriented Transport & Mobility project, is an urban R&D project including a Mobility Point in a junction on the Buda side, just like the pedestrianization of the Danube River embankment. Penang is at the initial stage in implementing CCTV to manage its traffic system. Nairobi has ongoing plans to install intelligent traffic system including intelligent traffic lights, road markings and signage installed. Cape Town has parking sensors that track cars parked in the CBD as well as traffic counters on highways. Buenos Aires has a network for measuring urban mobility behavior: the city’s sensors detect in real time the flow of people and vehicles. This information is available and open to the public. Belo Horizonte operates a PPP (Public Private Partnership) contract for Public Lighting, which provides for the replacement of all 182 thousand points of light of the city by LED luminaires. The city of Ottawa has tech embedded environments including parking sensors in major parking facilities and traffic flow systems. Ottawa is an Autonomous Vehicle Testbed so some areas of the city are equipped with the latest GPS and telecommunications technology and is coordinated with City
traffic systems and street lighting. As part of Wellington City Council’s Smart City Program the first generation of projects include environmental, parking, pedestrian and traffic sensing. These were combined with big data sources, machine learning and advanced GIS to help improve the city’s safety and environmental outcomes.

Cities that marked 5: Zurich, Belo Horizonte, Wellington (3 in total)

Crowd management (Q2.9)

The average score is 3.444.

Zurich has pilot projects to offer free WiFi in certain areas of the city and collect data to manage crowds, especially during big events. Seville has for several centuries dealt with large crowds in celebration of local traditions such as Easter, and has organized a security device called SECOP. Budapest launched a BKK FUTÁR Trip Planner System for web, smartphones and tablets. Florence established a queue management system at some museums and outlying center itineraries to manage big crowds. Penang has street cameras equipped with a facial recognition system. The archeological site of Petra and the city itself are monitored by cameras to track visitors’ behavior; the site also has a crowd management and evacuation plan. Nairobi Highways have installed street cameras that can provide footage when needed. Marrakech uses GPS data to monitor streets. Cumana launched Ven 911 as part of the pilot plan to increase safety, make road improvements and to insure peace for tourists. Buenos Aires’ Tourism Intelligence System includes information on tourism flows across the different tourist zones and neighborhoods within the city, based on GPS data from telecommunication companies. The Belo Horizonte Integrated Operations Center (COP-BH) is a strategic place for decision-making. Milan implemented technological solutions on the occasion of large public gatherings, such as major events, social or political demonstrations, strikes. In Macao, data acquired from the “tourism information interchange platform” includes GPS data from telecommunication companies, real time visitor arrival statistics, specified apps measure end user behavior statistics through big data analytics. “Smart application for visitor flows” predicts the density of visitor flows at 20 popular local tourist attractions 24/7, and categorizes forecast results at various levels from “comfortable”, “moderate”, “lightly congested”, “congested” to “heavily congested”, much to the benefit of visitors and industry operators. Ottawa has crowd management that incorporates all levels of government all of which use various crowd management tools when needed. Nur-Sultan’s “Situation center” works 24/7 and has an access to all public cameras with standing by police officers and medical cabinet. Several European cities (Zurich and Barcelona) mentioned restrictions with data protection laws.

Cities that marked 5: Seville, Yerevan, Petra, Belo Horizonte, Wellington (5 in total)

Digital monitoring of the environmental impact (Q2.10)

The average score is 3.351.

Barcelona has specific studies on “tourism carbon footprint” and is developing a sustainable tourism indicator system in the city. Seville’s environmental control devices for meters are distributed throughout the city. Measuring and evaluating air quality in Hungary is performed by the National Air Pollution Measurement Network (OLM). London monitors air pollution, river pollution etc. Penang has a flood alarm system and a Tsunami alarm system. Cumana is working with institutions as municipal services of environmental sanitation and the municipal office of monitoring linked to the space satellite ‘Francisco De Miranda’. Buenos Aires has a network for measuring environmental indicators including carbon dioxide, noise volumes, solar radiation, temperature, humidity, precipitation and seismic vibrations. Bogota frequently monitors the air quality; on occasion restrictions on driving are put in place and outdoor activities (like sports) canceled. Wellington uses regular GIS and Lidar mapping to create city models showing how the city is growing and changing. These models are also fed with sensor outputs allowing the city to understand climate change, impervious surfaces, sea level rise and seismic risks. Berlin has various measuring stations for noise, CO₂ and water. Additional consequences are drawn and, for example, zones with reduces speed limits are tested for traffic pollution.

Cities that marked 5: Zurich, Seville, Hague, Wellington (4 in total)

Tourism facilities with Internet access (Q3.1)

The average score is 4.162.

Zurich has a pilot project “digital concierge” in hotels. Barcelona has made a commitment of the City for digital transformation. More than 300 hotel establishments throughout Seville have the latest technologies. Moscow has an extensive wireless broadband coverage in most of its tourism facilities. Penang offers free WiFi in most of the hotels and shopping malls. Internet access in tourism facilities in Nairobi is almost compulsory. Lima is in the process of adapting digital tools as part of the tourist experience from the public and private sector, which is why most tourist establishments have an internet connection. In Macao, fiber internet connection is almost 100% fully covered.
Ottawa’s majority of tourism facilities offer internet to visitors using their services. All Wellington’s attractions have internet access. Budapest has the first hotel in Europe controlled by guest smartphones opened in March 2018. The 40 rooms of the 4-star KViiHotel, controlled by the TMRW Hotels application, uses the most innovative solutions of the 21st century; the TMRW Hotels smartphone application literally puts everything in the hands of the guests, from booking to checkout.

CITIES THAT MARKED 5: RIGA, BELGRADE, SEVILLE, VARNA, HELSINKI, FLORENCE, LONDON, YEREVAN, NAIROBI, CAPE TOWN, MADRID, MILAN, HAGUE, OTTAWA, WELLINGTON (15 IN TOTAL)

TOURISM FACILITIES PROVIDING FREE WIFI CONNECTION (Q3.3)

The average score is 4.216.

Zurich has free WIFI available in hotels and most restaurants, not yet full in public areas such as tourism sights. Budapest has almost 500 WIFI hotspots in the most frequented tourist areas including hotels, restaurants, bars, cafés, cinemas and theatres. Penang offers free WIFI in the city. Petra’s most of the tourism facilities such as hotels, restaurants, shops and public areas, provide a free WIFI connection. Nairobi’s most tourism facilities provide free WIFI connection. Marrakech provides free public WIFI in the airport, parks and the city. Cumana’s majority tourism establishments have internet connection and free WIFI. The vast majority of tourism service providers (hotels and restaurants) in Lima have WI Fi connection. The Wellington city provides free WIFI in streets, facilities and attractions. Berlin offers WIFI in hotels, shopping malls and some public touristic hot spots.


PUBLIC SPACES WITH FREE WIFI CONNECTION (Q3.3)

The average score is 3.919.

Riga has one of the fastest broadband internets in the EU Economic Zone. Barcelona offers free “Barcelona WIFI” in many spots of the City. Seville provides free WIFI connection in plazas, shopping malls and transport terminals. Budapest’s most plazas and shopping centers have a well-developed wi-fi network. In 2017, free wi-fi access configuration has been launched at the city’s busiest public transport hubs. The Municipality of Budapest is elaborating a Smart City strategy at present time. BFTK has proposed smart tourism projects: e-Budapestinfo Point Center (a smart information center working without human staff in city center), general Budapest tour guide application, crowd monitoring and visitor management for tourist attractions and hotspots. Florence offers tourists a map in which they provide where exactly the WI-Fi points (FirenzeWIFI project) across the city are and is part of “Free Italy WIFI” project. Petra’s free WIFI connection is available at the visitor center area and inside the site of Petra. Nairobi offers free WIFI in plazas, shopping malls, some public transportation, and private facilities such as hospitals. Cumana has free WIFI in 60% public spaces such as parks, squares, hospitals, shopping centers and transportation terminals. Buenos Aires offers ‘WIFI BA’ which comes with more than 244 free WIFI points installed in parks, squares, public spaces, community centers, libraries, museums, Metrobus and some subway stations. The “WIFI BA” service also provides complementary information on cultural events, transit, subway and buses. Bogota offers free WIFI in most cafes, hotels, pubs, airports, restaurants, bars, visitor information centers; and there is free WIFI hotspots in main tourist attractions. Belo Horizonte has public hotspots squares, tourist spots and also in towns and slums of the capital of Minas Gerais. Macao Post and Telecommunications Bureau (CTT) has been liaising with local organizations to offer free Wi-Fi services at different locations in Macao under a unified brand name “FreeWIFI.MO”, with the objective to make it easier for citizens and visitors to identify Macao’s free Wi-Fi service, and to further expand Macao’s free Wi-Fi coverage through joint efforts by the government and the private sector. Ottawa has extended its existing public Wi-Fi throughout the city to underserved communities and high-traffic public and tourist locations. Berlin offers WIFI in public spaces such as shopping malls and transport terminals.


TOURISM PLATFORMS ON MOBILE (Q3.4)

Zurich has mobile platforms for tourism information including maps, personal itineraries, ticket purchasing, and public transportation; there is also an Augmented Reality Tour Zurich. Barcelona is driving the digital transformation of society with initiatives like innovation hubs, introducing change through digital solutions such as 5G Barcelona, mobile week 4YFN. Helsinki provides the WeChat Helsinki Mini program, the Discover Helsinki app and the Blind-Square app. Budapest has a tourist information app called ‘guide.me Budapest’, that includes the official ticket selling platform of Budapest’s coolest multi-genre festival events ‘Interticket’, a brand-new Hungarian tourism sales incentive app ‘iWelcomeBudapest’, and a film destination app ‘Guide @ Hand’. Dresden offers mobile maps, cashless payment and audio guidance. Florence

New technology tools (Q3.5)

Seville offers digital platforms and virtual reality and the ‘Seville app’ was awarded in 2016 the best Urban Destination App. Varna has adopted virtual reality devices. Helsinki launched the app ‘Whim’ to develop Mobile as a Service and the ‘Virtual Helsinki’ project. With the help of go2maps, the Budapest Festival and Tourism Centre has made it possible to explore Budapetsinfo Point offices virtually so as to provide visitors with more information and a more immersive experience. Dresden offers VR devices at its different tourist attractions and an online, 360-degree panorama and motion mural about the airport. Moscow provides a growing number of AR city tours. Florence’s ‘digital signage’ project delivers information about events, things to do, opportunities, utilities; the city has an ‘Experience Florence digital booklet’. Nicosia will establish NFC technology in 3D installations at various sightseeing sites. Yerevan offers a collection of VR and AR applications such as ‘Toumaniann museum VR’, ‘Ararat Yerevan AR app’, ‘ARM culture AR’ and ‘SARYAN VR’. Nairobi has adapted the NFC technology for smartphone apps, VR technology in hotels and tour operators. Cape Town’s mobile Visitor Information Centers make use of VR devices when engaging with visitors and potential visitors to provide them with the experience of specific attractions and experiences within the destination. In Buenos Aires, VR is used for national and international promotion activities. Some of Lima’s sightseeing sites offer VR devices. Bogota is designing and producing AR maps for tourists and visitors and there is a 360 virtual tour available. Belo Horizonte adapted VR technology and a 360 model (capture images by DRONES), covering the whole area of interest, with 360 ° photos to create an interactive visitation experience with a high degree of immersion and realism. Madrid uses use new technology tools in its Tourist Assistance and Information System, for example, NFC is used in ticketing systems and VR devices, such as Madrid 360 and Faro Explorer. Turin has implemented interactive city maps and virtual reality for the virtual tour of Pietro Micca’s Museum. Milan adopted QR Codes and Bluetooth. Macao Tourism Chatbot, based on an IM platform to answer questions about sightseeing spots, activities, transportation and the weather will be launched in Q2 2019. Wellington uses the Welthank VR experience where New Zealand’s capital is transformed into the world’s first virtual city that you can explore and play as a game. This contains a number of immersive experiences that introduce tourists to the city and to experiences from local companies for use in overseas recruitment. Nur-Sultan’s the most attractive site “Bayterek” is going to introduce VR...
devices, interactive maps and online ticket acquisition. Zurich has a shared booking platform for our hotel partners to book city tours and excursions.

**Scope of tourism stakeholders engaged in digital platforms (Q3.6)**

The average score is 3.514.

Barcelona engages Barcelona Tourism Marketing Strategy and its network of shops. Petra engages stakeholders through the ministry of Tourism digital platforms. Nairobi engages the hospitality industry, tour operators and travel agents, government Parastals and County governments, media, tourism installations and suppliers. Cape Town lists its stakeholders on digital platforms and they are referenced across various social media platforms. Buenos Aires offers ‘BA Tours’ which is a market place of tourist experiences in which more than 100 tourism companies and entrepreneurs participate. Likewise, the InnovaturBA program promotes the digital transformation of the entire tourism value chain to increase the level of commitment with digital platforms by tourism stakeholders. Ottawa’s stakeholders engage on social media platforms such as Facebook, Instagram and Twitter.

Cities that marked 5: Zurich, London, Madrid, Wellington (4 in total)

**Non-commercial business models (Q4.1)**

Helsinki offers ‘Helsinki Region Infoshare’ and ‘HSL public transportation open data’. Budapest provides an official tourism information website and the official city pass Budapest Card website, and the official website of the Hungarian National Tourism Agency. Moscow has the ‘Discover Moscow’ website and mobile app, an open database about the city and several mobile apps. Florence’s projects include ‘Firenze Turismo’, ‘ATAF’, ‘eventi.comune.fi’ and ‘Alia servizi ambientali’. London has ‘TFL’, ‘Buspal’, ‘Citymapper’ and ‘VisitLondon’ apps. Yerevan offers ‘Transport for Armenia’, ‘Yerevan Events’, ‘A2BTransport’, ‘911 SOS Armenia’ apps. Marrakech is launching city hackathon to build an electric motor for clean air. Cape Town offers the Cape Town Tourism and City of Cape Town Websites as well as the Cape Town Tourism social media pages. Cumana provides the freemium as offer of public services, promotions of event services offered by the city and climate information. Buenos Aires has transformation services ‘BA Cómo llego’, ‘BA Subte’, ‘EcoBici’ and ‘BA Taxi’, and there is the free ‘BA WIFI’. Lima offers a tourism information website and social media. Belo Horizonte provides an application of Belo Horizonte City Hall, PBH APP, offering information on more than 1,200 services, of which 300 can be ordered over the internet. Berlin has digital solutions for transport, digital menu / restaurant, traffic and taxis. Turin has 5T which is a digital public service providing news on traffic and public transportation. Milan provides a mobile tourism website and applications for transport, bike and car sharing. City Hall services and events in the city. The Hague has information services about weather, public amenities, public transport and safety/ security/ health. Macao has ‘smart application for visitor flows’, ‘Bus Traveling System’, ‘Macao GeoGuide’ and ‘Real-Time Information Platform of Border Ports’. Ottawa has a transportation route app.

**Commercial platforms (Q4.2)**

Zurich provides a selection of apps that could be useful for your trip planning. Riga provides an App for local public transport. Barcelona has many shared economy platforms, both local and global, that offer tourism services. Helsinki offers Doerz, Chido, Get.tips, Whim, Discover Helsinki, Wowanders, Tripsteri, etc. Budapest’s ‘guide.me Budapest’ offers the latest news, top-lists, interactive maps and special offers for visitors. Dresden has social media channels, websites of the City of Dresden and Dresden Marketing Board, Motion Mural at the airport, and virtual reality systems to explore Dresden sights. Moscow offers two transport apps ‘Yandex.Transport’ and ‘Yandex.maps’. Florence provides ‘Destination Florence’. London offers QR codes for information, online digital and mobile apps. Nicosia offers platforms that provide commercial services for tourism events and festivals, accommodations, dining and related information. Yerevan has apps ‘Hike Armenia’, ‘Other Yerevan’, ‘Maps.me’, ‘DineBook’, ‘Menu.am’ and ‘GG’. Nairobi’s tourism businesses have adopted social media, websites and mobile apps. Marrakech has an official tourism website Visitmarrakech.com. Cumana offers apps including ‘Venetur’, ‘Venezuelan Tourism’, ‘Costadel Sol’, ‘Gran Carique’, ‘Conviasa’, ‘Naviara’ and ‘Navibus’. Buenos Aires offers apps such as ‘BA Tours’, ‘BA Planner’, ‘Travel Buenos Aires’. Belo Horizonte launched the new application, Belo Horizonte Surpreendente, providing the contents of major events such as Carnival and Arraial de Belo Horizonte. Berlin has digital restaurant, digital check in, taxi apps and real time data. Turin has a collection of platforms including Musement (online ticketing platform for museums, sporting events, food and wine experiences, nightlife) ; Glovo, Deliveroo, Just Eat, Eat in Time (food delivery platform); Tobike (bike sharing platform), Mobike (free floating bike sharing platform); Car2Go, Enjoy, (car sharing platform), BlueTorino (electric car sharing platform); MMoto (scooter sharing platform); Satispay (cashless payment platform). The Hague has implemented platforms for tourist information and hotel booking. Macao has a mobile payment tool ‘MPay’ and a mobile platform ‘AoMi’ for local consumer products and retail services.
Cooperation with Chinese companies (Q4.3)

Barcelona has two consortiums “Barcelona Tourism Board” and “Casa Asia” which are cooperating with Chinese companies. Helsinki launched a WeChat Helsinki Mini program and introduced Alipay. BFTK Budapest Festival and Tourism Centre, in cooperation with AIWTC Artificial Intelligence have launched a more targeted sales activity in China to promote joint city cards. Dresden is in cooperation with Ctrip and provides news on WeChat. Moscow is working with WeChat. Florence is promoting Shanghai & Florence - Sino-Italian Design Exchange Centre which works on Business connection, Customized Travel, Cultural and Art Exhibition, Enterprise’s Multinational Service. There is also a digital “Vento d’Italia” Project operated on WeChat to welcome Chinese tourists, provided by Italian Lifestyle di Roma and with the participation of the tourism promotion department of the City of Florence. London has done work with Weibo, Wechat and China Pay. Marrakech has an official tourism website in Chinese ‘visitmarrakech.cn’ and an official account on WeChat. Cape Town Tourism built a strategic partner with UnionPay to forge closer relationships between Chinese and local tourism operators. Cumana is beginning an alliance with Chinese visitors through the WTCF and the Ministry of Popular Power for Tourism. Buenos Aires has an enrolment regime for all travel agencies that work with tourists from China. Irkutsk has a Chinese-orientated website ‘china-online.ru’. The Hague has operated in multiple areas including Mini-programs: KPN & Wechat EU / NextportChina / NBTC China; Payment: Alipay & Wechat pay; Content: Gogodutch; Yaband; China Times; Nextport China. Macao has done work with Wechat, Weibo and AliCloud. Ottawa Tourism works with Chinese tour operators to facilitate quality experiences for Chinese visitors. WellingtonNZ is in collaboration with Alibaba. Berlin runs a Chinese website and works with agents in China along with WeChat and Weibo.

Health and safety insurance conditions (Q4.4)

EU countries require non-EU visitors to have valid health insurance. Riga provides free emergency services. Barcelona’s police forces patrol the city and are responsible for security, road safety and public order. Barcelona is editing new material to distribute to tour operators with practical security guidelines for theft prevention. London ensures health and safety conditions by enforcing very stringent policies for operating public food and beverage operations. Cape Town Tourism operates a Band Aid project that forms part of the Visitor Safety Program that assists visitors in the event of any negative in-destination experiences affecting their safety. Cumana offers health services for free with no condition of nationality. Buenos Aires’ public hospitals are open 24 hours a day and attend patients free of charge, and pharmacies are easily found all over the city. In Lima, the main access route from the airport to the hotel zone has a constant monitoring and patrol system to provide security for tourists, through a system of surveillance cameras, police patrols and enforcement emergency alerts, which makes traffic safer. Visitors who come to Torino (and more generally to Italy) do not need private insurance. In case of accident or illness, visitors are treated like citizens and can go to a public hospital where the fees are affordable. Nicosia’s public health system as well as a large number of private hospitals are open to any visitor.
1.1 A Brief Introduction to Current Tourism in Beijing

Beijing is a profoundly rich historical and cultural city that has an abundance of tourism resources, and features a wealth of high quality scenic spots. Beijing is among the first group of famous historical and cultural cities in China, and has 8 5A-level scenic spots, 6 world cultural heritage sites, 99 important heritage sites under state protection, more than 200 open-access scenic spots and more than 7,000 cultural relics and historic sites. It is the richness of its tourism resources that is the reason it attracts so many domestic and overseas tourists.

Beijing’s goal is to be “the window demonstrating Chinese civilization and a world-class tourism city”. In 2018, the total number of tourists to Beijing reached 310 million, an increase of 4.6% over the previous year, generating total tourism revenue of RMB592.1 billion, an increase of 8.3% year-on-year. The rapid development of Beijing’s tourist industry has resulted in a number of emerging problems. Tourist resources and the environment are severely impacted by passenger flow and disorderly tourism, and there are disagreements between locals and tourists. To respond to them, Beijing is aiming to be a smart tourism city, striving to accentuate quality over quantity, as well as increase efficiency in its tourist industry.

1.2 Core Theme of Smart Tourism Development and Its Contribution to Smart Tourism in Beijing

The core theme of smart tourism development in Beijing could be summarized as “innovation, sharing and quality”.

Innovation: This city is now home to over 20% of the high-tech enterprises from around China, the most concentrated areas are global AI, big data and cloud computing. Innovation is the driving force for cultural tourism in this city, with continuous efforts devoted to the innovation of this philosophy, one implementing industry integration and management mechanism together with a system of smart tourism, having formed a sound innovation climate.

Sharing: Most of the higher ranking scenic spots are located in the core areas of the city. Thus, it’s a key for smart tourism development to coordinate the relations between citizens and tourists, to ensure resources co-sharing by tourists and citizens, to strengthen the functions of tourism serving, thus benefiting and enriching people, lifting the living standards of citizens and driving the development of a sharing, cultural tourism.

Quality: To develop its tourist industry, Beijing will transform from the quantity and scale-oriented tourism to an efficiency and intensity-oriented one. Quality will be taken as the essential requirement for the development of tourism in Beijing. Through the efforts of smart tourism, the quality and efficiency of tourism development will be
promoted, resulting in the quality of tourism services raised in Beijing.

1.3 Result of Smart Tourism City Construction in Beijing

1.3.1 Priority of developing smart tourism in Beijing

Both government and market are making efforts to drive the construction of smart tourism in this city, to raise the quality of tourism. To be specific, the government is driving the standardized construction of smart tourism, improving public tourism services based on smart technologies and realizing the data-based and intelligent management of the tourist industry. And the market is innovating the transportation modes, enriching tourism products and achieving the application of new-type high technologies in tourism scenarios.

(1) Driving the standardized construction of smart tourism of Beijing

As early as in 2012, Beijing took the initiative to publish the Specifications on Construction of Smart Scenic Spots in Beijing, Specifications on Construction of Smart Hotels in Beijing, Specifications on Construction of Smart Travel Agencies in Beijing and Specifications on Construction of Smart Tourism Villages in Beijing, and formulated the Beijing “Smart Tourism” Action Plan (2012-2015). In 2016, the Beijing “Thirteenth Five-Year” Development Plan for Smart Tourism (2016-2020), Specifications on Enhancement of Smart Scenic Spots in Beijing, Specifications on Enhancement of Smart Hotels in Beijing, Specifications on Enhancement of Smart Travel Agencies in Beijing and Specifications on Enhancement of Smart Tourism Villages in Beijing (collectively, the “1+1+4” Planning System) were enacted in succession. In 2018, the Specifications on Informational Services for Smart Scenic Spots was formulated in Beijing. A series of specifications and plans for developing smart tourism have been prepared and enacted, serving as an effective promotion and guidance for smart tourism construction for Beijing based tourism enterprises and facilitating the development of smart tourism.

(2) Data-based and intelligent management of tourist industry in Beijing

Beijing has established and improved its e-government office system, tourism business electronic office system, government affair website service, etc., which has realized vertical and horizontal business information interconnection and interoperability, and deepened the IT and intelligent technology application by the department of tourism’s internal and external management. At the same time, it has worked out an electronic travel itinerary for the tourism team, enabling intelligent supervision over the tourism market, smoothing the order of the tourism market, and promoting the development of Beijing’s quality tourism. Through the construction of

Figure 1.1 The “1+1+4” Planning System of Beijing

![Image of the "1+1+4" Planning System of Beijing]
its tourism big data platform, government management decisions are more scientific and government department coordination is simplified.

Based on the Internet of Things, cloud computing, AI technology and big data, Beijing's Haidian District has built the “brain of the city”. Intelligent, refined and dynamic management in urban management, public safety, urban transportation and in ecological environmental protection, as well as the modernized new urban governance system, have all been realized.

Big data, video surveillance, the Internet of Things, artificial intelligence and other technologies have been widely applied in scenic areas, hotels and travel agencies throughout the city, which in turn contributes to data collection and the refined management over resources, vehicles, persons, the environment and other elements.

(3)Lifting public tourism services based on smart technologies

A tourism public information service platform, a panoramic virtual travel platform for explaining the A-level and above scenic spots, “i-tour Beijing” mobile client, “Beijing Smart Travel Map” WeChat official account, etc., have all been established in Beijing. The visitbeijing.com website is improved, and each of the tourism enterprises are offering all-round smart services based on PC and mobile applications, smart explanation system, smart parking system, self-service ticketing system, VR virtual reality technology, etc., all of which work together to improve the traveler’s experience. Haidian District of Beijing is creating the “Haidian Culture Cloud” platform offering tourists one-stop public cultural services with culture as the content, with technology as the means, and is based on the public culture needs of residents and utilizes VR, AR, LBS, big data and other information technologies.

(4)Innovating transportation modes

Startups and innovating technological enterprises are emerging in Beijing. Shared bicycles, shared vehicles and other services have been providing citizens and tourists with convenient travel. Among them, in the “sharing economy” mode, the Didi Chu Xing makes it possible for residents and tourists to hail a taxi by just “one click” on their mobile phone; Mobike bicycles, Haro bicycles, etc., provide shared bicycle service for residents and tourists, who can use the bicycle after scanning the QR bar with their phone. The “last kilometer” to scenic spots can thus be quickly reached. GoFun and Shouqi Limousine & Chauffeur are offering the “shared cars” for residents and tourists to use as needed in their short- and medium-distance self-driving tours.

(5)Enriching tourism products

In recent years, the tourism market in Beijing has developed vigorously, with the supply of tourism products continuously enriched and innovated, fully satisfying the diversified tourism consumption needs of tourists. In particular, in its integration of
“culture + tourism + technology”, Beijing serves as a model across the country.

The Forbidden City, integrating traditional culture and modern fashion and applying high technologies such as virtual reality and augmented reality, manages to constantly create and innovate cultural content and culturally creative products. As of now, it has developed more than ten thousand cultural products, generating cultural creation revenue of over RMB1.5 billion annually. Meanwhile, the Summer Palace, Temple of Heaven, National Museum, Capital Museum, etc., are developing tourism and cultural creative derivatives around their own historical and cultural features. It took the Summer Palace four years to develop the “Eight Yihe Views”, a cultural creative cake. The Temple of Heaven is promoting its “Tiantan Haowu” both online and offline; the Capital Museum, by making full use of its cultural relic images, colors, patterns and utensil shapes of the famed collections Yuan Blue and White Phoenix Head Flat Pot (Yuan Qing Hua Feng Shou Bian Hu) and Tophus Pink-Passion fruit-Pattern Duomu Kettle (Song Shi Lv Di Fen Cai Fan Lian Wen Duo Mu Hu), has launched two lines of creative derivatives; the Former House of Qi Baishi has worked out one hundred and more
creative derivatives based on the classic intention in the paintings of Qi Baishi.

(6) Employing the application of new high-technologies in tourism scenarios

Beijing is at China’s and the world’s forefront in terms of exploring the application of cloud computing, big data, artificial intelligence, 5G technology, autonomous driving and other new technologies in the tourist industry. Through cooperation with Huawei and China Mobile (Beijing), Yuyuantan Park has realized the first application of 5G technology in the park scene, facilitating the intelligent construction of Yuyuantan Park and enhancing the intelligent tourism experience of residents in appreciating the cherry blossoms and traveling in the world. Beijing Capital International Airport applies face recognition technology to provide domestic and foreign tourists with intelligent navigation, face-scanning car search, face-scanning security check, face-scanning boarding and other smart face-scanning services to enhance visitors’ boarding experience and improve tourist satisfaction. By means of the virtual reality and augmented reality and other optical technologies, Yuanmingyuan Scenic Area has created the “Digital Yuanmingyuan”. Digital models are added onto the ruins, really bringing back the historical scene of this park.

1.3.2 Specific goals of smart tourism development of Beijing

Aiming at the goal of building a “world-class tourism city”, active efforts have been made to develop and apply artificial intelligence, AR augmented reality, unmanned driving, 5G technology, the Internet of Things, cloud computing and other technologies and means to provide tourists with plentiful and convenient and quality smart tourism services (both online and offline) and encourage the innovative application of new technologies, new products and new business to realize the quality development of smart tourism.

It manages to coordinate the relationship between citizens and tourists to Beijing. The sustainable development philosophy of catering to both “hosts” and “guests” is contributing to a more harmonious life and tourism development, having realized resource sharing by both residents and tourists.

A data management system that integrates data collection, quantity management, data sharing and collaboration has been established, capable of refined management of the tourism market, tourism enterprises and tourists, strengthening the supervision of the tourism market, effectively alleviating the pressure from passenger flow to Beijing, and creating a new urban governance model.

1.3.3 The main effect of developing smart tourism in Beijing

At present, Beijing is taking the lead in China in terms of standards setting, content construction, technological innovation, resource integration and institutional mechanisms, being a model and reference for the development of smart tourism in other parts of the country. Among them, as for standards setting, Beijing has compiled a “1+1+4” planning system and launched the Specifications on Informational Service for Smart Scenic Spots to standardize the construction
of smart tourism construction at scenic spots; in terms of content construction, the municipal tourism management departments, tourism scenic spots, etc., will further improve the construction of smart tourism in management, service, marketing and other aspects, and continue to promote the development of smart tourism; when it comes to technological innovation, many high-tech technology companies in Beijing are frontrunners in applying face recognition, unmanned driving, 5G technology and the Internet of Things to guide the development of smart tourism; for resource integration, the China Smart Tourism Industry Association has been set up in Beijing, which integrates the upstream and downstream tourism and academic resources to co-drive smart tourism development; in terms of institutional mechanisms, Beijing is working hard to employ innovated institutional mechanisms and has taken the lead in proposing a “time-division appointment” system, a reference for online ticket booking mechanism in major scenic spots in China.

1.4 Mission and Vision of Beijing in Smart Tourism City Development

1.4.1 Realizing a new-type urban governance

As part of smart tourism’s development new means and mechanisms such as electronic travel orders for tour groups and online time-division ticket booking are finding application in Beijing, an effective way to disperse tourist flow in core areas and downtown areas. This is the new urban governance model of smart tourism + urban governance.

1.4.2 Resource sharing by citizens and tourists

Real-time collection, monitoring and early warning of tourist data based on emerging technologies such as big data, mobile internet and cloud computing, real-time insight into tourist flow density, tourist flow direction and tourist trends is thus possible. Efforts are made to comprehensively grasp tourist travel rules, development trends, and tourist needs, generally consider and synergistically design an urban smart tourism information release system, smart ticket booking system, intelligent traffic guidance system, etc., and realize resource sharing by residents and tourists based on a sustainable development philosophy that caters to both the “hosts” and their “guests”.

1.4.3 Taking the lead in the application of high technologies

Beijing enjoys plenty of high-tech enterprise resources such as artificial intelligence, big data, cloud computing, etc. In the future, it should give further play to the technological advantages of such enterprises and explore the innovative application of artificial intelligence and big data technology in the tourist industry for enabling urban tourism management, tourism services and tourism marketing; thereby energizing and continuously enhancing Beijing’s leading role in the field of smart tourism.
1.4.4 Improving tourist satisfaction

Through the application of modern technologies such as 5G, the Internet of Things and artificial intelligence in the tourism industry, the tourism experience will be smarter, richer and more convenient, and the personalized and independent needs of tourists will be fully satisfied.

1.5 Main innovation fields of developing smart tourism in Beijing

1.5.1 Demonstration application of artificial intelligence in tourism industry

Now tourists can experience unprecedented AI technology by taking the unmanned shuttle bus and using the smart face recognition runway, smart living room with future special experience, and other projects in Haidian Park. Tourists can be shown around the park by the unmanned shuttle bus which can be booked via WeChat. Via the face recognition runway, the park records the status, exercise duration, course and speed of tourists with face recognition technology. And the smart living room with future special experience provides tourists with services such as voice recognition, intelligent music playback, and robot explanations.

1.5.2 The electronic travel order for tour groups enabling stricter market supervision

Beijing is working on the electronic travel order for tour groups by providing booking services, strengthening the supervision of the tourism market and guaranteeing the quality of tourism services and the interests of tourists. Tourists can book online tickets and travel routes of all scenic areas in the city, making it easier for travel agencies and tour guides to fill in and register the information. With such order, law enforcement units could easily collect evidence, revivify qualifications and manage records in terms of tour guides or travel agencies without licenses, scenic spots can verify the order, and tourists have an electronic tourism contract.

1.5.3 The “time-division appointment” ticketing system at scenic spots is launching a new tourist flow and appointment management mode

In 2017, the Forbidden City scenic area took the lead in launching the “time-division appointment” ticketing system across the country, effectively alleviating pressure from excessive tourists, thus ensuring a quality tourist experience and improving the service quality at scenic spots. Through the implementation of this system, the Forbidden City subverts the inherent mode of waiting in a long queue to tickets. It is the first scenic spot to implement “time-division appointment” ticketing system and real-name ticket booking system throughout the country, a reference for other scenic spots.
1.5.4 Pioneering the “culture + tourism + technology” integrated development

Recently, the Forbidden City scenic area has been at the forefront of the country in terms of cultural connotation mining, innovation culture communication, cultural product development, etc., having achieved the effective integration of “culture + tourism + technology”, designed and created the “Duanmen Digital Museum” product and “Wangzhuan Gugong” service, which not only meets the needs of a public cultural experience, but also inherits the tradition, increases the number of visitors and lifts commercial benefits.

On the basis of the history and culture of the Forbidden City, more than ten thousand cultural products have been developed, generating revenue of over 1.5 billion RMB annually. It joined hands with Tencent to launch the H5 invitation letter titled Walk through the Forbidden City to See You, which is a combination of the Forbidden City and the emerging things, attracting a large number of young tourists. The Wangzhuan Gugong application was developed for spreading knowledge in an interactive and interesting way. To mark the 92nd anniversary of the Palace Museum, the Discovery: Yangxin Hall—Theme Digital Experience Exhibition theme digital experience exhibition was arranged in the Forbidden City, helping tourists understand its history in an interesting and experience-based way.

1.5.5 Realizing regional tourism dynamic service and supervision

In 2018, the Huairou District Bureau of Culture and Tourism developed and built a smart tourism service platform, realizing the new experience of “traveling around Huairou with just your phone”. The platform integrates tourism enterprises and resources such as scenic spots, BNBs, traditional folk households, hotels and guests achieve seamless online and offline docking, having enhanced the intelligent service and management level of scenic spots, traditional folk households, hotels and other enterprises, leaving more space for tourists to act on their own and providing them convenience. Dynamic data transmission, statistics, analysis, sharing and management lay the foundation for intelligent service and management of government departments. At present, the platform is joined by 20 and more scenic spots, performing functions including electronic maps and navigation, online and offline ticket and room booking and meal ordering, offline meal ordering by scanning the QR bar and one-click calling for help and complaint registering. To be specific, smart parking lots have been completed at five scenic spots at or above 4A level, and 1,689 BNBs and traditional folk households are equipped with the “Xiang Cun Bao” application and handheld devices, with which tourists can book rooms online, check in personally with their ID card and order meals by scanning the QR bar. The Huairou District Bureau of Culture and Tourism has established a tourism data center and emergency command center, which can receive real-time monitoring of video signals and data, tourist flow and traffic flow data in 20 scenic spots, receive traffic and financial data from 11 hotels, and receive guest data from 1,600 traditional folk households and BNBs. The Beijing Cultural and Tourism
Bureau electronic itinerary system can be connected to 20 scenic-spots. It can connect the electronic travel order system of the Beijing Municipal Bureau of Culture and Tourism with systems of 20 scenic spots.

1.6 Main beneficiaries of developing smart tourism in Beijing

The main beneficiaries of developing smart tourism in Beijing are tourists, citizens, scenic spots and tourism management departments.

For tourists, the development of smart tourism in Beijing will make it easier to collect information and book tickets. Traffic guidance will be more in time and problems related to overcrowding can be avoided, necessary for improving travelers’ experience. Besides, AR, VR, robot and other technologies will provide tourists with more wonderful smart experiences and to make the tour more interesting.

For the citizens of Beijing, the development of smart tourism effectively restricts the growth of the number of tourists, protecting them from being interrupted by tourists, and thus realizing resource sharing by both citizens and tourists. Moreover, citizens are offered online product sales services on an e-commerce platform, enriching the daily cultural, sports and leisure life of residents.

For scenic spots, development of smart tourism in Beijing will improve their ability to manage tourists, vehicles, resources and the environment in a smart way, provide tourists with better services and realize intelligent and precise marketing.

For tourism management departments, construction of smart tourism in Beijing will realize effective data and refined management of tourism enterprises, tourism markets and tourists. On the basis of big data, they could make scientific policies and decisions and carry out new-type urban governance with the help of innovative smart tourism technologies.

1.7 Attachment

1.7.1 Electronic itinerary of the travel team

The Beijing Municipal Bureau of Culture and Tourism organized to develop the tourism team electronic itinerary system, through which formal travel agencies and tourism passenger transport operators can conduct business confirmation and qualification approval, and generate the electronic itinerary and QR code, thus providing an authoritative identity for visitors to distinguish formal “one-day tour” and also offering technical support for law enforcement to investigate and treat the illegal “one-day tour”.

1.7.2 “i-tour Beijing”

Beijing has built “i-tour Beijing”, a portable tourism consulting terminal, to allow tourists to enjoy considerate and satisfactory tourism consulting services whenever and wherever. The terminal covers information introduction, snack information, discount information about all scenic spots in Beijing, and provides social services for tourists.

1.7.3 Haidian Digital Public Platform for Culture Service

In 2017, Haidian District built the Haidian “Culture and Tourism Cloud” platform, which took full advantage of the integration of culture and science & technology. With culture as its content and by means of science and technology, the platform starts from the needs of residents and tourists for public culture has pooled and integrated public cultural resources such as cultural activities, cultural facilities, cultural heritage, artistic performances, books and periodicals, as well as built a range of service functions including an event calendar, live broadcasts, culture map, VR venues, online lecture halls, readings in Haidian, a culture chart gallery and characteristic brands, by use of virtual reality (VR), augmented reality (AR), location-based services (LBS), large data analysis and other technologies. Haidian Digital Public Platform for Culture Service is the main channel of public cultural service supply in Haidian. Residents and tourists have access to one-stop, menu-type, order-type and readily available public cultural services anytime and anywhere through different entrances such as APPs, WeChat official accounts and computer terminals.

So far, the platform has published 12,870 activities, 22,206 pieces of cultural information, 52,003 original pictures, 4,901 online classes, 1,298 cultural facilities, 707 cultural activity rooms, 400 accounts of cultural heritage, 140,000 volumes of electronic books, 110,000 volumes of electronic periodicals and 600,000 volumes of audio books. The platform has experienced a total number of about 18,292 million visits, with the average daily visits reaching about 34,800, total real-name registered users of around 107,554, total orders of 116,751 and a total of 24,862 messages.

1.7.4 Haidian city brain

In 2019, Haidian District launched the “brain of the city” based on the Internet of things, cloud computing, AI technology, big data and other technologies. The intelligent dispatching of emergency command in the field of urban management and the intelligent discovery and automatic disposal of urban management incidents has been preliminarily realized. The perceptive network platform for the Internet of things covering the district has been set up, which...
achieved the dynamic management of existing building information in the district. In the field of public safety, the visual center of “brain of the city” has been preliminarily constructed, and the real-time monitoring of fire control in more than 900 key units in the district has been realized. In the field of ecological and environmental protection, the fine monitoring and early warning of the district’s air quality has been achieved and effort has been made to explore the application of new technologies and products in river and lake water quality monitoring. In the field of urban transportation, the off-site law enforcement and disposal at thousands of sites has been implemented.

1.7.5 Demonstration case of “culture + tourism + technology” of the Forbidden City

In 2013, the Forbidden City began to sell such cultural and creative products as the Forbidden City calendar, folding fans printed with “personal words” and colorful ear studs with the theme of “colorful-stone printed with “personal words” and colorful technologies such as a large projection screen, virtual reality (VR) headset, motion capture device and touchable screen, visitors experienced the dialogue with high-ranking officials, reviewing memorials to the throne and other interactive parts, so as to understand the history of the Forbidden City in a more interesting and experience-based way. In 2017, the Forbidden City, together with CCTV, jointly launched the “National Treasure” to promote the history and culture of the Forbidden City and its collections (The Vast Land, Porcelain Mother (Large Bottle of Colored Glaze), Stone Drum), which aroused a strong response at home and abroad. In 2018, the Forbidden City, together with Beijing TV Station 2???, launched the documentary Reviving the Forbidden City, which broke the audience’s stereotype of the Forbidden City, and created cultural and creative products bearing the stories of the Forbidden City, so as to make innovations in and pass on the culture of the Forbidden City. In 2019, the Forbidden City and Beijing Capital International Airport cooperated and developed a digital Forbidden City cultural exhibition, cultural and creative product promotion and other aspects.

1.7.6 Digital Yuanmingyuan

In cooperation with the School of Architecture of Tsinghua University, Yuanmingyuan Scenic Area has created the “Digital Yuanmingyuan” by means of 3D laser scanning, remote sensing, virtual reality and other technologies. The “Digital Yuanmingyuan” by means of 3D laser scanning, remote sensing, virtual reality and other technologies. Digital models are added onto the existing ruins, really bringing back the historical scene of the Yuanmingyuan. More than 80 professionals have sorted out more than 10,000 historical files, designed 4,000 restoration drawings and constructed 2,000 digital architectural models. The baking technology has been adopted to interpret more realistic lighting effects and reproduce120 groups of time-space units in the six historical stages of the Yuanmingyuan. Restoration of a scenic spot requires more than ten procedures, including accurate collection and recording of site information, fine study of literature, technical analysis of building construction and virtual splicing of damaged components. Visitors can “pass through time” to the period of the High Qing and visit the Yuanmingyuan without leaving their homes by following the WeChat official account “Digital Yuanmingyuan”.

1.7.7 “AI Technology Park” of the Haidian Park

In 2018, Haidian Park became the world’s first AI technology theme park by introducing unmanned driving, smart face sweeping, AR augmented reality technology, etc. Visitors can tour the park riding in driverless buses. With the face recognition technology the pace and the duration and distance of the registered tourists can be automatically recorded, and these visitors can search the running ranking by scanning their face. Using face recognition
lockers, visitors can store and take out their articles by themselves by scanning their face. And visitors can communicate with the smart voice pavilion and get information during their rest in the smart voice pavilion.

By creating the “future space”, efforts are made to show visitors the cutting-edge content of science and technology and their future application. Through voice recognition, the system can perform tasks such as closing the curtain and turning off the lamp. And the system can automatically sense tourists’ emotions and adjust the background of the roof screen and music content according to tourists’ emotions through the face recognition technology. The intelligent robot provides tourists with information about future space, scenic guides and other services.

1.7.8 Application of 5G technology in the Yuyuantan Park in Beijing

Through the introduction of 5G technology, Beijing Yuyuantan Park has created the “5G+ Smart Park” on a pilot basis, realizing the first practical application of 5G technology in a park. Taking advantage of the high speed, large bandwidth and low time delay characteristics of 5G network, problems such as online ticket purchase and admission code scanning signal congestion during rush hours can be solved. At the same time, the park has installed 31 high-definition AI cameras, through which administrators can monitor the flow of visitors in real time.
2.1 Introduction

With a population of 2.9 million inhabitants and an estimated 12.8 million in its metropolitan area, Argentina’s capital Buenos Aires is the center of one of the 20 largest urban conglomerates in the world. It has two international airports receiving more than 750 international and 1000 domestic flights per week, making it a strategic South American hub.

2.1.1 Tourism development

In 2018 Buenos Aires received nearly ten million tourists (an increase of 3.2% over the previous year) of whom 2.7 million were international visitors. 2.04 million arrived by plane, 490,000 by port, and 110,000 as cruise visitors (an increase of 15.8% in comparison to 2017). 50,000 visitors came through other entry points. According to the Buenos Aires Tourism Intelligence System, the average length of stay for international tourists that left the country through airports was 9.9 nights in 2018, and the main motivations were Holidays (48%) and Business (26%). When looking at expenditures, Holidays decreases to 40% and Business rises to 33% (Figure 1). Brazil (27%), Uruguay (11%) and Chile (9%) are the major South America incoming markets whereas visitors from Europe are 17%, and those from the US and Canada 11%. Domestic visitors in city hotels were 2.6 million in 2018, with a decrease of 8.6% in comparison to 2017 mainly due to a fall in the population’s purchasing power. Most of the domestic visitors were hosted in other temporary accommodations.

As of December 2018, there were 557 hotels and other temporary accommodations in Buenos Aires, 19% of which are 4 and 5 star hotels. The highest category hotels accounted for 46% of the total rooms and 41% of the beds. Hotels, especially those rated 4-star and above, are mainly located in the areas of the city most frequented by tourists. Buenos Aires is undoubtedly an attractive destination because of its very active cultural life: it boasts 150 museums, 219 theatres and auditoriums, 216 libraries, 5 Opera Houses, 3 top end cultural centres, the Planetarium Galileo Galilei, 3 theme parks, 3 traditional fairs (Mataderos, Mercado de San Telmo, Mercado de las Pulgas), more than 2,600 restaurants, hundreds of trade fair artisans and more than 400 booksellers. Buenos Aires also has a Tourist Bus with 3 different routes linking attractions to the city’s tourist areas.

International tourism expenditures in 2018 amounted to about 2 billion US dollars. When adding the revenue from domestic tourism, tourism’s combined total generates about 3% of the city’s GDP. In 2018, an average of about 151,000 people were formally employed in the Travel & Tourism industry branches every month (44% in restaurants, 22% in transportation, 10% in accommodations and 24% in other services).

2.1.2 Tourism planning and management

The organization responsible for destination planning and management is the Buenos Aires Tourism Board-BATB (Ente de Turismo de Buenos Aires), an autonomous public body under the scope of the General Secretariat and International Relations of the
city. The BATB’s goal is to consolidate the city’s position as an intelligent destination that promotes sustainable and inclusive development through innovation and technology, and to promote collaboration between the private and the public sector.

The BATB has four general directorates and two advisory committees comprised of public and private representatives. The general directorates are:

1. Technical, Administrative and Legal.
2. Tourism Development.
3. Tourism Communication & Promotion.
4. Market Intelligence.

The BATB has nine Tourist Assistance Centres strategically located in the city’s most popular tourist areas.

2.2 Key Performance Areas

2.2.1 Data ecosystem

Buenos Aires has developed data collecting and data analysis procedures that relate to urban and environmental management. This data science initiative is led by the Buenos Aires Smart City General Directorate of Information Sciences; its goal is to produce strategic knowledge using Big Data. Some of the urban and environmental initiatives and projects undertaken to date are of interest for tourism:

1. A network of sensors to measure real time flows of people and vehicle mobility.
2. A network of sensors to detect in real time levels of carbon dioxide, noise volumes, solar radiation, temperature, humidity, precipitation and seismic vibrations.
3. An open platform called Commercial Opportunities Map aiming to provide street and neighbourhood indicators to help potential investors design business plans for specific locations.
4. The Interactive Map of Buenos Aires, a user oriented Geographical Information System including general and transportation information, routes and itineraries.

Regarding the tourism industry, the city has its Tourism Intelligence System. This initiative incorporates Big Data in order to better understand tourism and to make beneficial tourism policies and decisions (see Section 1.4).

2.2.2 Sustainability

The environment and sustainability are pillars of the government’s BA Resiliente strategy. Within this framework, Buenos Aires is implementing the following strategies: reduce energy consumption, control waste management at the metropolitan level, increase recycling capacity, develop new green spaces and promote sustainable construction. Additionally, the Environmental Protection Agency is developing an environmental quality index that monitors water quality, surveys contaminated sites, and generates certificates of environmental impact.

Buenos Aires City supports pedestrians and non-motorized public transport modes through different projects:

- EcoBici, the city’s free public bike-share system.
- A 250 km network of bicycle paths.
- The smart card “SUBE” for public transportation.

Within this framework and after the city’s engagement with the United Nations 2030 Agenda for Sustainable Development in 2016, the BATB has directly linking its actions with the SDG’s objectives. Tourist product development promoted by the BATB is also aligned with the goal to build a sustainable destination through the preservation and valorization of the city’s cultural heritage, both tangible and intangible. As examples of this commitment, the BATB is promoting the preservation of notable cafes and bars as well as fileteado porteño, the popular stylized artistic drawing and lettering that is combined with flowering, climbing plants used throughout Buenos Aires. Additionally, jointly with the Ministry of Environment...
and Public Space, it is also promoting the project “Sustainable walking trails network in the Costanera Sur Ecological Reserve”, with the aim to increase appreciation of the city’s natural resources through tourism.

From the private sector perspective, 76% of the 63 tourism operators who have implemented the Argentine Tourism Quality System program (SACT) have Environmental Management certification, and 39 operators have implemented the recommended Environmental Management Guidelines. Additionally, the Association of Tourism Hotels of the Argentine Republic (AHT) has implemented a pioneering environmental certification, Hoteles más verdes (Greener Hotels), which as of June 2018 had 15 Buenos Aires member establishments. All of them are part of the catalogue of the city’s distinguished tourism providers. This tool seeks to promote organizations that are working to make tourism sustainable and inclusive.

Finally, social inclusion, which is a priority for the City of Buenos Aires, is also part of the BATB agenda. Initiatives such as the BA Convive program, COPIDIS, and the Commission for the Full Participation and Inclusion of Persons with Disabilities work together with the BATB in the development of the following tools:

- The Accessible Tourism Guide, which gives information about the city’s accessibility, including routes, maps, pictures and places of interest.
- The Accessibility Guide for tourist accommodations.
- The Accessible Tourism Best Practices Manual, a tool to raise awareness and train stakeholders who work directly or indirectly in the tourism sector.

Currently, 24% of the 63 tourism operators who have implemented the Argentine Tourism Quality System program (SACT) have an Accessibility certification.

2.2.3 Smart tourism tools

InnovaTur BA, the first tourism innovation program in Latin America, aims to contribute to the transformation and positioning of Buenos Aires as a smart and sustainable destination. It promotes innovation and digital transformation across the whole value chain of participating tourism operators through networking and continuous learning. It has involved more than 1,500 participants and has built a number of strategic alliances with private corporations and third sector organizations (19), other city government departments (17), influencers (8) and universities (3).

Moreover, as a city committed to become a smart and sustainable destination, Buenos Aires provides the following free applications to help tourists:

- Port at Night
- Horse Racing
■ ‘Travel Buenos Aires’, a mobile app that works offline in Spanish, English and Portuguese with an interactive map, recommended itineraries, geo-location, and augmented reality, and that also sell tickets.

■ ‘BA Tours’, the official online store of BATB with more than 370 city-wide activities and experiences.

■ ‘BA Planner’, an intelligent events calendar that allows visitors to plan their visit ahead of time and find last minute offers.

More importantly, all three applications are part of a common digital communication and marketing strategy whose goal is to build a unique world class brand based in a diverse city offering its porteño (port city) identity. This strategy includes the web, social media, newsletters and digital tools, as well as content and procedures that have been produced in house by the BATB team to guarantee their coherence with their objective: to ensure adequacy for each e-communication channel (YouTube, Facebook, Instagram, Twitter, Google) and to adapt them to their different targeted markets. This digital strategy is also linked to the BATB Public Relations program, the annual BATB events and fairs attendance plan, and it offers guided visits and tours.

Finally, as part of the “Turismo a más barrios” plan, the BATB has developed a geo-referenced tourism map; it is self-guided and includes downloadable audio-visual content for each of the city’s 48 neighbourhoods. The goals of this map are to increase awareness among local residents about the importance of tourism; deepen their understanding of their role as hosts, and to transform them into active communicators and local ambassadors of the culture and identity of each neighbourhood.

2.2.4 New business models and innovative mechanisms

Several digital public non-commercial mechanisms operate in Buenos Aires providing information regarding public services and amenities, transportation, safety and security, climate, and others through specific applications. They include the following:

■ ‘BA Cómo I llego’, to help people get from A to B in the city, whether on public transportation, by car or on foot.

■ ‘BA Wi-Fi’, to access free Wi-Fi hotspots all over the city.

■ ‘BA Móvil’, to keep visitors updated on the transport situation in real time.

■ ‘BA Ecobici’, to map out bicycle lanes and the availability of city bikes for hire.

■ ‘BA Subte’, to check the state of the underground metro system in real time.

Additionally, the Association of Tourism Hotels of the Argentine Republic (AHT) is currently starting a program to stimulate establishments to adapt to digital transformation trends.

2.3 Chinese market

The Chinese market is small but has been increasing over the last three years in accordance with the requirements expressed in the MOU signed on “The facilitation of travel for groups of Chinese citizens to the Argentine Republic” in 2015. Argentina has an enrolment regime for all travel agencies that work with tourists from China. Specialized operators are emerging and some traditional travel agents are opening new business activities oriented to the Chinese market.

In addition, Argentina offers visas for 10 years of validity for Chinese citizens who travel to the country. This solution is added to the existing AVE (Electronic Travel Authorization) system, which allows Chinese citizens who have a valid visa issued by the United States or a Schengen visa, and who travel as tourists to Argentina, to request Electronic Travel Authorization through the Internet addressed to the National Direction of Migrations of Argentina. Special agreements also exist between Argentina and Chile in order to facilitate Chinese arrivals.

2.4 Success story: The Tourism Intelligence System

0. KEY PERFORMANCE AREA No. 1: Data Tennis Court
collecting, data analysis, smart applications for research.

1. NAME OF THE CITY: Buenos Aires


3. ENTITIES IN CHARGE OF IMPLEMENTATION: Ente de Turismo de Buenos Aires (BATB) under the scope of the Directorate General of Market Intelligence.

4. MISSION: To generate key information utilizing Big Data analysis to guide the public and private sectors through the tourism sector's decision making process in the city of Buenos Aires.

5. VISION: To produce strategic knowledge using Big Data techniques, strengthening tourism governance and making effective data driven decisions in an ever-changing and competitive market.

6. OBJECTIVES: The Tourism Intelligence System of the City of Buenos Aires is part of the Buenos Aires Tourism Observatory. Established in 2009, the Tourism Observatory has currently undertaken several data projects involving three main areas of work:

   (1) Economic analysis: economic impact, employment, investment, market forecasts, international and domestic travel. This includes the analysis of data provided by the International Tourism Survey and the Hotel Occupation Survey conducted by the National Institute of Statistics and Census of Argentina with collaboration from the national Tourism Secretariat and the city Statistics and Census Directorate. As a result, the Observatory periodically issues reports about foreign and national tourism, which are available online (foreign visitors monthly reports, visitors profile quarterly reports, annual visitors and annual tourism profile reports and the Latin American quarterly Tourism Monitor).

   (2) Qualitative research: primary data collection, surveys, interviews, ethnographic studies, focus groups, hotel occupancy, and market segments. This includes to date specific segmented analysis about MICE, Cruises, cultural, gastronomy and educational tourism as well as projects related to resident satisfaction and perception (in the Palermo and San Telmo neighbourhoods).

   (3) Big Data: following the objective to incorporate Big Data into the Tourism Observatory Information System, in 2017 the BATB created the Tourism Intelligence System, collecting and analyzing large volumes of data with the aim to strengthen the governance of tourism and to improve the quality of public policy. Big Data included in the Buenos Aires Tourism Intelligence System relate to four main areas: air connectivity, hospitality, gastronomy and tourism.
mobility (Figure 3).

Therefore, the objective of the Tourism Intelligence System is to transform Big Data from different sources into useful knowledge for both public and private sectors within the entire tourism value chain as well as for researchers, operators’ organizations, academic institutions, the press and the media. Specific goals are the following:

- To integrate Big Data information in tourism analysis.
- To incorporate the resulting information into the public and private tourism decision making process, to facilitate the design of tourism policies and the governance of tourism.
- To use Big Data to orientate sustainable communication, marketing and development strategies.
- To create a dynamic platform for data visualization for tourism stakeholders and the general public.

7. MAIN INNOVATIVE FEATURES:

The Tourism Intelligence System allows the understanding of Buenos Aires’ position in relation to its competitors, to anticipate forthcoming trends, to know the behavior of different segments of the tourist market, and to monitor the movement of visitors across neighbourhoods and attractions. At the same time, it allows stakeholders to evaluate the competitiveness of businesses and to strengthen product development strategies. This initiative integrates numerous sources of information provided by the National Tourism Secretariat, SEGITTUR Spain, Amadeus, Buenos Aires Smart City General Directorate of Information Sciences, Teléfonica Argentina, Aeropuertos Argentina 2000, and the National Department of Migration, among others. The innovative features of this initiative are the following:

1. The compilation and use of Big Data sources such as digital e-commerce platforms related to accommodation and gastronomy, social networks with travellers’ comments and opinions, records of electronic searches and flight bookings from abroad to Buenos Aires, and mobile GPS phone data from national and international tourists (Figure 4).

2. The rigorous processing and analysis of big data using processes that guarantee privacy and confidentiality in accordance with international recommendations.
3. The identification of new trends and the generation of strategic knowledge for decision making:
   a. Prediction of future demand based on flight reservations.
   b. Analysis of tourists’ opinions on accommodations, gastronomy services and tourist attractions.
   c. Estimation of flight occupancy rates.
   d. Study of inbound and outbound passengers per flight.
   e. Analysis of tourist mobility throughout the city, neighbourhoods (including special events such as the San Telmo fair), events (such as the Asado championship, Gay Pride 2017), sports events and tourism attractions.

8. BENEFICIARIES OF THE INITIATIVE: The Observatory works with different public and private organizations and associations such as the Association of Tourism Hotels of the Argentine Republic (AHT), the Association of Hotels, Restaurants, and Cafes (AHRCC), the Association of Travel Agencies, the Chamber of LGBT Tourism, the Association of Airlines, and others. It also cooperates with the National Secretariat for Tourism of Argentina, the National Direction of Migration, the National Aviation Council, Aeropuertos Argentina 2000, and public bodies at the local level in fields such as culture, heritage, gastronomy, public space and environmental security, and local transport, among others.

9. IMPACT AND EXPECTED OUTCOME: Figure 5 summarizes the impact of the initiative over the destination and its diverse stakeholders. It also has a positive impact directly on the local community by granting free access to information.

Benefits of the system to date can be observed in data driven decisions already made by public administrations and private operators:
- The development of a law for fiscal incentives for hotel investment through identification of the need for improvements in the accommodation supply.
- The study of potential demand to drive new air connections.
- The redefinition and segmentation of digital marketing and communication strategies.
- The development of new products and experiences based on market needs and profiles (gastronomic tourism, educational tourism, MICE, culture, sports, and others).
- The interaction with other areas of local government to strengthen general governance of the destination by defining strategies regarding security, transport and traffic, public space and other areas.

In the near future, the Tourism Intelligence System will expand by broadening the range of Big Data sources used including information such as tourist credit card expenditures, measurement of different transport flows and geo-localization of tourists through connection to Wi-Fi spots within the city.

Figure 2.4  Tourism Intelligence System impacts flow.

Source: Sistema de Inteligencia Turistica
3.1 Brief Introduction of Chengdu Tourism

Chengdu has many nicknames such as the Brocade City (Jincheng) and the City of Hibiscus (Rong for short). Renowned since ancient times as a Land of Abundance due to its fertile plain (see Fig. 1 and Fig. 2), Chengdu is home to giant pandas, China’s national treasure that enjoys great popularity among people around the world. Named as the Cultural City with the Most Chinese Characteristics, the Best Tourism City in China, the City of Gastronomy among others, Chengdu boasts two UNESCO world heritage sites: Dujiangyan Irrigation System and Mount Qingcheng. In addition, Chengdu has four national scenic attractions, four national forest parks, and one national Geopark, and the city has also built 91 A-class scenic spots. More than 7,000 tourist hotels have been constructed. As the fourth Chinese mainland city and the first one in Western China to implement the 72-hour visa-free transit policy, Chengdu will become the third city on the Chinese mainland, and the first in Western China, to have two international airports. Chengdu has opened a total of 335 air routes, including 114 international (regional) routes and 203 domestic routes, setting up a network of international air routes that covers the whole of Asia with direct flights to North America, Europe, Oceania and Africa. In recent years, Chengdu has hosted numerous world meetings, events and activities such as the G20 Financial Leaders’ Meeting, the Fortune Global Forum, the World Chinese Entrepreneurs Convention (WCEC), the 22nd General Assembly of United Nations World Tourism Organization (UNWTO), the First General
Assembly of the World Tourism Alliance and the Belt and Road Tourism Minister Roundtable.

In 2018, for example, Chengdu welcomed 240 million tourists, up 15.9% from last year, grossing a total of 371.26 billion yuan of revenue, up 22.8% (see Fig. 3) from last year. In the meanwhile, however, the surge in the number of tourists brings great pressure to the transportation, services, and emergency treatment facilities. Hence there is a great need for a higher quality of smart, intelligent, and digitalized tourism. For that, Chengdu, based on the construction of a Smart Tourism city, strives to build a modernized smart cultural tourism city characterized by “primary and secondary inclusiveness; open and sharing” in terms of innovative technological methods, operation and management, and service and marketing model.

### 3.2 Core Theme of and Contributions to Smart Tourism

Chengdu enjoys various competitive strengths, including a comfortable living environment, a vast economic hinterland, a diverse talent pool, comprehensive industries, a favorable business environment, as well as convenient government affairs services, all laying a solid foundation for its Smart Tourism growth. All of these are essential for realizing the core theme of “open and sharing, efficient intelligence, and industrial innovation”.

#### Efficient Intelligence

Chengdu carries forward big data construction in culture, radio, and tourism, and establishes a platform for “Data Collection”, giving full play to big data, cloud computing, Artificial Intelligence (AI), block chain and other new generation information technologies. Besides, we combine the forces of the government and market, and solve the problems such as fragmented assembly, application, data and service, so as to advance the progress of Smart Tourism driven by data. For that, we will push forward with big data for culture, radio and tourism in Chengdu, to achieve city-wide and full chain coverage.

#### Open and Sharing

Chengdu injects Smart Tourism into the construction of a beautiful park-like city that is intelligent and comfortable to live in. Specifically, Chengdu set up Tianfu Citizen Cloud platform and quickly built up fast and convenient infrastructure in terms of smart community, healthcare and transportation. Furthermore, we will make great efforts to facilitate Smart Tourism to enrich and benefit tourists, and to push forward the project of targeted poverty alleviation through rural tourism, so as to construct a model world tourist city featuring Chengdu characteristics.

#### Figure 3.3 Chengdu Tourism Growth Foundation and Overview

![Figure 3.3](image)

**Figure 3.4 Core Theme of Smart Tourism City**

![Figure 3.4](image)
Industrial Innovation—Positioned as the “Land of Giant Pandas”, and “Land of Ease”, Chengdu rolls out an all-round upgrade to Smart Tourism + (See Figure 4). In order to raise Chengdu’s prestige in the world, we need to drive its tourism onto the international path, and hold numerous campaigns such as international and regional conferences, exhibitions, cultural exchanges, sports and art, gourmet festivals and other leisure activities here. Centered on Smart Tourism, Chengdu will produce plentiful tourist products including heritage sites, entertainment, shopping, gourmet dining, business exhibition, cultural creativity and health resorts.

3.3 Mission and Vision of Smart Tourism City

3.3.1 Building a Convenient Smart City

Chengdu aims to gather strength and resources from all sectors on the basis of management service, to promote the smart, digitalized, and intelligent development of tourism, thereby providing individualized and smart service for local residents and tourists. Guided by the sustainable principle of “primary and secondary inclusiveness, open and sharing”, Chengdu meets the needs of tourists and residents in regards to catering, accommodations, transportation, touring, entertainment, shopping as well as the development of business, healthcare, study and leisure tourism. Chengdu will develop Smart Tourism by constructing a smart city, driving the city with data, and strengthen functional energy levels and soft power so as to maintain harmony among tourists, residents, enterprises and the government.

3.3.2 Making Smart Decisions Driven by Data

Backed by Data Collection, Chengdu must focus on constructing a big data center and advancing the progress of decision-making, management, and innovation driven by data. On top of that, Chengdu strives to construct data-driven Smart Tourism via exploratory application of Internet of Things (IoT), cloud computing, AI and other modern information technologies to achieve wide-area data coverage. By doing so, Chengdu assists enterprises in tapping targeted markets at home and abroad, and develops a high-quality, efficient Smart Tourism industry, in order to promote the overall benefits of society and the market to build itself into a modern Smart Tourism city.

3.3.3 Developing a Multi-dimensional Smart Industry

Chengdu gives full play to modern information technologies such as IoT, cloud computing and AI to achieve wide-area data coverage. In order to construct Smart Tourism, Chengdu assists enterprises in tapping targeted markets at home and abroad, and develops a high-quality, efficient Smart Tourism industry. For that, we must promote the upgrading of Smart Tourism, and improve the innovative application of tourism big data, and take the lead in generating scale effects in the market. At the same time, we need to advance the integration of tourism with culture, sports, education, exhibition, commerce and other industries.

3.4 Performance and the Building of a Smart Tourism City

3.4.1 Development Goals of a Smart Tourism City

Chengdu’s Smart Tourism is designed to lay the infrastructure’s foundation, implement the “Smart Tourism +” plan, and establish a big data ecosystem for tourism, thereby improving smart cultural tourism service (see Fig 5). The development goals include A: grasping the opportunity of big data to improve the infrastructure...
construction of Smart Tourism. For that, we need to promote the upgrading of traditional tourism and the progress of Smart Tourism, and build a tourism system with information applications in Chengdu, one that utilizes Smart Tourism products, sectors, transportation, environment and culture. B: based on information, implementing the “Smart Tourism +” plan, integrating multiple sectors like healthcare, research and study, industry, agriculture, sports, and culture into tourism, so as to promote the upgrading of industrial structure by driving the progress of tourism via project construction, and establish an ecological environment for the big data industry. C: via scientific strategies grounded on the big data platform, breaking through the communication barriers and facilitating coordination between official departments to achieve efficient governance. Additionally, during important holidays, we offer technical support for multiple departments to make joint decisions, monitor the visitor flow volume of tourist attractions in real time and send warnings when necessary.

3.4.2 Construction Tasks of a Smart Tourism City Platform

The Construction of Smart Tourism in Chengdu is based on the needs of tourists, and on making the most efficient use of modern information technologies. Specifically, Chengdu needs to improve the infrastructure of Smart Tourism, increase the level of marketing and public information services as well as the intensive management and personalized service of tourism enterprises. What’s more, Chengdu will enhance supervision of the tourism industry and facilitate Smart Tourism construction in the districts (cities) and counties, to drive a modernized, intelligent and Smart Tourism via information application. We aim to build a big data application platform and Smart Tourism service mechanism (See Fig. 6) in a multiple-dimensional and comprehensive manner, setting a model for Smart Tourism construction in China.

(1) Issuing Specifications for Smart Tourism

Chengdu has compiled a series of location standards of Smart Tourism, such as Specifications for Tourism Informatization Service in Chengdu, Construction Specifications for Smart Tourism Attractions in Chengdu, Construction Specifications for Smart Tourism Hotels in Chengdu, Construction Specifications for Smart Tourism Travel Agencies in Chengdu. In addition, Chengdu will make solid progress in the evaluation of demonstration units for tourist attractions, hotels and travel agencies, and give one-off bonuses to units that are up to evaluation standards, so as to rank among the top cities in Smart Tourism construction.

(2) Improving Smart Tourism’s Infrastructure Capacity

Chengdu facilitates the construction of infrastructure such as broadband, wireless networks, direct international exclusive circuits, city-wide direct internet connections, a base of data storage and backup for disaster recovery, and a cloud computing center. On top of that, Chengdu has established a communication infrastructure system ranging from transmitting, exchanging, storing, backup for disaster recovery, public computing to public safety, and promotes integrated service in the sectors of network transmission, information distribution, computing storage and information safety. In short, Chengdu plans to create a 24/7 “City Brain” that is able to monitor online, analyze, predict and command in emergencies, greatly enhancing the supporting capacity of infrastructure for Smart Tourism (See Fig. 7).

(3) Constructing a Public Service Platform for Smart Tourism

According to the general concept of intensive construction, collaborative governance, intelligence decision-making and diversified application, we plan to build up a big data center of cultural tourism, a big data infrastructure as a service (IaaS), management platform as a service (PaaS) and management software as a service (SaaS), to construct an essential data-driven framework. In detail, we will comprehensively integrate the management functions of multiple departments, exchange information on major issues and decisions, so as to help departments better collaborate with one another with a higher management efficiency. Building a service platform for Smart Tourism includes web portals and intelligent mobile terminals. The result will be an improved level of service and tourist experience. Furthermore, based on the information of accurate tourist sources, we will establish a marketing platform for Smart Tourism that includes a network data monitoring and analysis system, a statistical analysis system of tourist vehicles, and a communication capacity monitoring and analysis system. We will carry out targeted marketing and offer accurate feedback and decision-making assistance for the growth of tourism. This necessitates conduct chain analysis of cross-platform communication, impact evaluation of media communication and other technological innovation methods, to analyze the communication capacity of targeted marketing, marketing depth, and distribution channels, and the effects of information communication.

(4) Promoting Tourism Information Application Infrastructure

We should achieve full coverage of wireless networks in smart hotels, wireless networks
and mobile communication signals at smart tourist attractions, and wireless networks in tourist reception areas in smart travel agencies, and provide tourists with the terminal equipment to utilize wireless networks\textsuperscript{16} 17. To be more specific, we plan to carry out demonstration projects of e-interpretation and smart tour guides at key tourist attractions, trying to achieve full coverage in AAA and above tourist attractions across Chengdu by 2020. We plan to cover major tourist attractions with digital devices and multimedia tools, such as interactive touch screens and tablets, for the purpose of information exchange. In addition, we will launch the "tourism + financial payment" one-card system and annual cards for tourist attractions with Chengdu’s local characteristics, enabling tourists to "tour around Chengdu with just one card".

### 3.4.3 Major Influences and Achievements of Smart City Tourism

1. **Impacts of a Smart Tourism City**

The task of building Chengdu into a Smart Tourism city will be completed via multi-source and multi-dimension system integration and the construction of an isomerized, intensified and cross-department big data platform with the following results: First, for Chengdu citizens, the Smart Tourism city will, within the framework of primary-secondary inclusiveness, provide them with one-stop city service and make their lives happier. Second, for tourists and tourism enterprises, the Smart Tourism city platform will add more value to tourism services, improve their management efficiency and performance, help publicize tourism brands and industrial upgrading and maintain sustainable development, to increase tourists’ satisfaction and loyalty to tourism brands. Finally, for the Chengdu Municipal People’s Government, the Smart Tourism city platform will drive multisource data integration for the government and enterprises to cooperate, so as to improve the service and management performance of both parties, break through the data barriers for the purpose of scientific decision-making (See Fig. 8).

2. **Major Achievements**

Major achievements of building Chengdu into a Smart Tourism city are as follows: standardization for Smart Tourism, digitalization of tourism governance, and diversification of industrial innovation (See Fig. 9).

A. **Standardization for Smart Tourism**

To further implement the national smart city pilot projects and facilitate the construction of Smart Tourism in Chengdu, a total of ten demonstration Smart Tourism attractions, 15 demonstration restaurants, and 21 demonstration hotels were selected in the light of Construction Specifications for Smart Tourism Attractions, Hotels, and Travel Agencies in Chengdu. We will carry out demonstration projects of
e-interpretation and smart tour guides at key tourist attractions, and cover major tourist attractions and tourist distribution centers with tourism information interaction terminals such as PCs, tablets and interactive touch screens. On top of that, we need to give full play to VR, AR, MR and holographic imagery to launch experiential projects like animation tourism that tourists can participate in.

B. Digitalization of Tourism Governance

Digitalization of tourism governance is reflected on the “light, isomerized and transboundary” big data platform with “one center and multiple supports” built on multiple information technologies. The “one center” refers to the office system between tourism enterprises and Chengdu Culture, Radio and TV, Press and Publication Bureau as well as tourism-related departments. These “multiple supports” are the tourism data from Chengdu city and its districts and counties. In establishing the digitalization of tourism governance, we aim to offer tourism enterprises more convenient third-party data interfaces and platforms, to drive cooperation among departments by “centralized management, unified maintenance, single sign on (SSO), and data sharing” (see Fig. 10). Through data analysis of tourist numbers, revenue and distribution, Chengdu can further optimize allocation of tourism resources.

C. Diversification of Industrial Innovation

We must organically integrate multisource and multi-dimensional data. In other words, we need to develop visualized mobile platforms like big data platform, WeChat mini programs, and mobile Apps, to provide public service information about tourism, understand tourists’ needs in time, and set up a better public service system. In doing so, we strive to make tourists more satisfied and conduct a smart marketing platform for rural tourism that integrates local products, consulting services and marketing supervision, to further provide individualized and convenient online booking and push notification services for tourists.

3.5 Innovations of Smart City Tourism

3.5.1 Innovation in Institutions and Policies to Drive the Development of Chengdu as an International Tourist City

Chengdu signed the Strategic Cooperation Frame Agreement with the China Tourism
3.5.2 Innovation in Technology Application to Drive the Progress of Tourism

(1) Innovation in Application Platform

Via data fusion technologies like cloud computing and distributed storage, Chengdu has established application platforms of data integration, an achieved innovation goals in data fusion for Smart Tourism. For example, we have set up a data center and command center in Dujianyang, giving full play to cutting-edge technologies like big data, cloud computing, IoT and AI, making Chengdu a pioneer practitioner in information application of all-for-one tourism across China. For tourists, Chengdu, based on its mobile end, has developed functions like live-stream at tourist attractions, guide to tourist attractions, voice guide, tourist Q&A, and complaint notification, demonstrating Chengdu’s excellent cultural tourism resources to every Chinese tourist, and achieving full-coverage on catering, accommodations, transportation, shopping and entertainment as well as on new sectors like business, healthcare, study, leisure and adventure tourism. For citizens, Chengdu has especially created the Tianfu Citizen Cloud, a one-stop, mobile “Internet +” platform that offers citizens comprehensive and convenient services like e-government, transportation, medical service, and cultural tourism service.

(2) Innovative Application of Smart Technologies

Chengdu, selected as one of the first cities for 5G commercial use, is trying to make itself into the “A City of the Future, a Capital of 5G” (see Fig. 11). Dujianyang has been applying 5G Smart Tourism technologies, such as Ultra HD livestreaming at tourist attractions and 5G real-time monitoring of the visitor flow volume, and using a “VR panorama of Chengdu” to catalyze the “5G + cloud VR” industry and promote the progress of 5G applications like tourism big data, IoT and VR. As a result, tourists can watch the VR livestreaming of multiple scenic spots at Dujianyang. At the same time, at Sino-Ocean Taikoo Li Chengdu, tourists can see “dinosaurs” wandering on the street via a MR headset. In addition, Chengdu Research Base of Giant Panda Breeding has built up comprehensive theme pavilions via innovative technologies to study and protect pandas, promote popular science education, advertise, and offer entertainment and recreation. So, tourists can enjoy a higher-quality, deeper experience via VR technology. (see Fig. 12).
3.5.3 Innovation in Management Mode to Improve Efficiency

We need to employ multiple modes in a flexible way for real occasions (see Fig. 13). For example, the Mount Qingcheng and Dujiangyan Smart Tourism big data platform will adapt the smart application mode of “anticipation, safeguard plan and resource allocation”\(^2\). The contingency mode is designed specifically to cope with emergencies in traffic, hygiene and public order during the peak season. In detail, based on communication technologies like Beidou Navigation Satellite System, video monitoring and wireless intercoms, we will establish an intensive, efficient, and quick-response law enforcement system and tourist calling system, and then combine them into the emergency command center (see Fig. 14). Within one hour before the 2017 Jiuzhaigou earthquake took place on August 8, the monitoring team of Chengdu obtained the accurate point location, and the real-time condition of tour guides, vehicles and tourists, and then analyzed data to help multiple departments collaborate to carry out efficient, orderly emergency evacuation (see Fig. 15). Since the Spring Festival of 2019, Chengdu Culture, Radio and TV, Press & Publication Bureau has moved into the Chengdu Smart Governance Center with other relevant municipal departments (emergency, public order, etc.).
security, transportation, urban park, market supervision, meteorology, statistics and water service), to make concerted efforts in operation and analysis, early warning, consultation and coordination, service and assurance, and emergency management a reality. With supervision priorities taken into consideration, we will try to build a holiday-mode big data platform that integrates a government affairs cloud, a citizen cloud, traffic data, environmental protection data, and business tourism data (see Fig. 16 and Fig. 17), to further release more dynamic information and better guide visitor flow during holidays and other peak seasons. In doing so, we aim to perfect our video monitoring system for tourist attractions, and our early warning professional meteorology system, monitoring in the case of a geological disaster, and the environment. In addition, we share and synchronize information with the emergency platforms of command centers at all levels, to exert stronger security monitoring capabilities and emergency management at tourist attractions. We are also trying to create an early warning and intelligent voice system that monitors the loading rate of visitors at tourist attractions in real time based on tourist LBS. Frequency of updating and monitoring on visitor flow volume can be as fast as once every five minutes, more than six times the efficiency of the original system.

### 3.5.4 Innovation in Service and Marketing Modes to Increase Satisfaction

(1) Tourism Monitoring

Chengdu has seamlessly connected with 12301, the national tourism supervision service platform of China, to keep up-to-date with the real-time coordinates and traces of all the tour groups in the city (see Fig. 18). In the meantime,
multiple departments can collaborate to supervise, offer services, or implement contingency plans, creating a system of dynamic monitoring and feedback between tourism departments and other departments or ministries, offering tourists a comfortable and safe experience. On April 30, 2019, Chengdu held the Security Emergency Tabletop Exercise for “May 1st” Cultural Tourism and Holiday Security Work Conference (See Fig. 19, Fig. 20 and Fig. 21). Backed by the resources of the Chengdu Smart Governance Center and the Emergency Platform of Cultural Tourism Big Data Monitoring, we initiated multiple exercises via centralized command and expert assessment at the Smart Governance Centers in Wuhou District, Shuangliu District and Dujiangyan. Specifically, we simulated various types of potential yet probable accidents such as exceeding the maximum tourist loading rate, a sudden fire, a tourist drowning, and a rock avalanche at three tourist attractions- Huanglongxi, Jinli and Mount Qingcheng. Via Q&A with municipal departments and command centers at district (city) and county level, and tabletop exercises of field management departments, we tested the emergency treatment mechanism of district (city) and county governments as well as relevant functional departments, assessed the operability of their emergency plans and their ability to put them into practice. By doing so, we carried out drills instead of training, to efficiently improve our ability to handle emergencies, highlighting the coordinated teamwork by municipal and county governments and relevant departments.
(2) Tourist Service

Chengdu has held “tour around Chengdu with one cellphone” to help tourists enjoy “Smart Tourism in Chengdu”. For that, we have created a mobile App that offers a variety of information on navigation, introduction, tour guidance and shopping guidance at tourist attractions (see Fig. 22), enabling tourist access to information about entertainment facilities, activities, tour routes, promotions and discounts. Our App can locate tourists in real time via intelligent navigation to automatically identify the location of tourists and recommend scenic spots or supporting facilities nearby, and to recommend the best tour routes and destinations. Additionally, our App provides tourists with self-help tour guidance, profile identification for reservations and getting in line, and an online mall, with service channels like “one-button tour”, “one-button reservation” and “one-button complaint”, thereby comprehensively improving the quality of our service and tourists’ satisfaction.

(3) Innovation in Marketing

Chengdu will integrate Smart Tourism with festivals, network platforms, marketing channels and media operations, so as to build a marketing mode that centers on the innovation labels of its own special industries—“Land of Giant Pandas, City of Leisure, City of Gastronomy, and City of Exhibitions” (see Fig. 23). The focus, in the meantime, will be centered on holding the following three major forums—Fortune Global Forum, World Tourism Destinations Forum, and World Chinese Entrepreneurs Convention; festivals like the Giant Panda International Eco-Tourism Festival, the Intangible Cultural Heritage Festival, the International Gourmet Festival, and the International Village & Ancient Town Tourism Festival; and three major competitions—World Destination City Selection, “Enjoy
Chengdu” International Photography Competition, and the China International Mountain Quest. In essence, we use big data from signaling terminals to accurately profile the identity characteristics and tour preferences of tourists, making the best of new marketing channels like Weibo, WeChat, micro film and Apps for the purpose of sustainable operation (see Fig. 24). In so doing, we strive to make tourism marketing much more accurate, widespread, targeted, responsive, and intelligent.

### 3.6 Beneficiaries of Smart Tourism City Development

The main beneficiaries of developing Chengdu into a Smart Tourism city are citizens, tourists, enterprises and the government (see Fig. 25).

For citizens, against the backdrop of building Chengdu into a Smart Tourism city, we make great efforts to promote the Internet + tourism mode, to provide citizens with convenient one-stop service with the help from integrated life platforms like “We Are In Chengdu”, “Tianfu Citizen Cloud” and “Tour around Chengdu with one cellphone”, making citizens' lives and suburb tours more convenient, making life in Chengdu more modernized.

For tourists, based on the driving force of “primary-secondary inclusiveness”, we give impulse to a tourism service system supported by big data, draw support from...
modern information technology, achieve B/C/G connection, establishing an all-round, multi-dimensional, all-in-one tourism ecosphere, providing tourists with the most comfortable and convenient travel experience.

For enterprises, Smart Tourism now helps tourism enterprises in Chengdu analyze user behavior, as well as monitor tourist attractions in real time via big data platforms, hence optimizing the operation mode of tourism, establishing excellent tourism service, and promoting the upgrading of product structure, so as to improve the reputation, targeted marketing, and operating income.

3.7 Attachment

3.7.1 Big Data Construction of Cultural Tourism in Chengdu

Based on the demands of Data Collection
proposed by the CPC Chengdu Municipal Committee and the Chengdu Municipal People’s Government, we adhere to the plan of “intensive construction, coordinated governance, intelligent decision-making, and diversified application”, striving to achieve the goal of “more accurate analysis, more precise decision-making, more targeted marketing, more elaborate products and more refined services”. In detail, the government and markets make concerted efforts to gather government affairs data resources, input more historical data, enhance data mining and analyzing, crack barriers of data sharing, in order to achieve full-chain and city-wide coverage in cultural tourism big data construction from four dimensions-government, enterprise, tourist and citizen. First, according to the technical standards and demands raised by the Chengdu Smart Governance Center, we try to upgrade the core framework of cultural tourism big data platform. Second, we developed an intelligent data collection platform center to ensure the accomplishment of Data Collection task. Third, we build up an emergency mechanism in the platform to better cope with all sorts of emergencies. Fourth, we upgraded video monitoring at the Smart Governance Center to meet national standards, to further achieve omnidirectional video monitoring. Last, we will continue to build a statistical and analytical model of cultural tourism big data, to probe into the development patterns of the tourism market and tap into the market advantages.

3.7.2 Cases of Smart Tourism

(1) Mount Qingcheng - Dujiangyan

The Dujiangyan Digital Information Network Management Center has established an intelligent system that, centered on “two centers, one database and two platforms”, covers Smart Management, Smart Service and Smart Marketing with its over 30 sub-systems, helping Dujiangyan make the initial step towards the goal of “digital resource protection, intelligent operation...
Attached Fig. 6  Platform Interface of Dujiangyan Tourism Big Data Center

Attached Fig. 7  Monitoring, Warning and Satisfaction Analysis at Dujiangyan Tourism Big Data Center

Attached Fig. 8  App Interface of “Tour around Dujiangyan with one cellphone”

Attached Fig. 9  Functions of “Tour around Dujiangyan with one cellphone”
and management, and industrial integration network”. The Center won the “Best Demonstration Smart Tourism Attraction” awarded by the Ministry of Culture and Tourism, and the “Demonstration Based on Smart Tourist Attraction” by the Ministry of Housing and Urban-Rural Development of the People’s Republic of China, and was responsible for the Demonstration Project of Smart Tourism Application with the Beidou Navigation Satellite System’s 13th five-year plan. During 2017-2019, the information application project was included in the National Project of Building Facilities for Protecting and Utilizing Cultural and Natural Heritages of the 13th five-year plan. What’s more, we have developed a mini WeChat program called “Tour around Dujiangyan with one Cellphone”, covering pre-tour, tour and post-tour stages. With it, tourists can get information on every tourist attraction at Dujiangyan, as well as intelligent functions like one-button shopping, consulting, one-button complaint, one-button flower identification, one-button tour, one-button restroom location and big data application. Besides, tourists can also get access to information about traffic, remaining spots in parking lots, weather forecasts and air quality. Based on the functions above, our App can plan a reasonable tour route for tourists and give them a pleasant experience of “Touring around Dujiangyan with one Cellphone”.

(2) Happy Valley Chengdu

The Smart Tourism App “Happy Valley” is a mobile application that integrates guidance in navigation, introduction, tour guidance and shopping guidance at tourist attractions, providing tourists with information on entertainment facilities, activities, tour routes, and promotions and discounts. The App can also locate tourists in real time via intelligent navigation, to automatically identify their location and recommend scenic spots or supporting facilities nearby, and to recommend the best tour routes and destinations. In addition, we carry out interactive activities via our official Weibo, WeChat account and promotion platforms, to trigger further advertisements by giving out prizes, strengthening brand building and elevating the functions of our service system to an even higher level.

(3) Guosetianxiang Theme Park

At the Guosetianxiang Theme Park of Chengdu, we have established an advanced system of booking and checking tickets, so that tourists can scan their ID card or QR Code to gain admission. Besides, “Aileyuan”, our independently developed system, offers self-help tour guidance, profile identification for reservations and getting in line, and online mall service. In detail, we have transformed the traditional lockers at the water park into “WeChat + wristwatch” self-help rental lockers, and offers rafts and small electric cars for tourists to rent by themselves. Tourists, on the other hand, can book tickets online, order meals, register complaints or give rewards, get in line, and look at voice or map guidance on their cellphones. All of these not only make tourists more satisfied, but also reduce operation costs. Another App “Zouquwan” developed by Guosetianxiang Theme Park has integrated the resources of nearby tourist attractions to offer tourists more convenient and diverse services.

(4) Xiling Snow Mountain

Via management by information application, Xiling Snow Mountain has built up a comprehensive intelligent management platform centered on tourists’ experiences with priority in big data and future market planning. Xiling has also integrated information applications into hardware to bring about the following five functions: an intelligent mobile ticket system that matches with current e-commerce platforms; an intelligent parking guidance system; a multi-level tourist distribution system; an intelligent information release system; and a comprehensive data analysis system. In particular, Xiling releases real-time queue status on large screens in the parking lots and on the “En Route” App, so that tourists can choose to play in the tourist center or at other experience stores to enjoy a more satisfactory journey.
Attached Fig. 11  Smart Tourism Apps in Guosetianxiang Theme Park

Attached Fig. 12  Smart Tourism Functions of Guosetianxiang Theme Park

Attached Fig. 13  Visualized Platform of Tour Bus Big Data in Guosetianxiang Theme Park

Attached Fig. 14  Intelligent Comprehensive Management Platform of Xiling Snow Mountain
Chapter 3 Endnotes

3. Figure Source: Chengdu Planning and Management Bureau; Content Source: Chengdu Municipal People’s Government Official Web Portal http://www.chengdu.gov.cn/chengdu/c120590/2018-10/11/content_c0347a848414274a17576b84357884e.shtml
4. Figure Source: Chengdu Tiandi Map http://www.tianditucd.cn/index.jsp; Content Source: Chengdu Municipal People’s Government Official Web Portal http://www.chengdu.gov.cn/chengdu/c120590/2018-10/11/content_c0347a848414274a17576b84357884e.shtml
6. The General Office of CPC Chengdu Municipal Committee (2018). Decision of CPC Chengdu Municipal Committee on thoroughly studying and implementing the guiding principles from General Secretary Xi Jinping’s important instructions in his visit to Chengdu and speeding up building Chengdu into a beautiful and livable park city.
Guiyang City
China
In 2018, the number of trips to Guiyang was 188 million, a YoY increase of 26.68%, realizing total tourism revenue of RMB245,656 million, a YoY increase of 31.23%, including 20,641,700 trips made by domestic overnight tourists and 120,000 trips by inbound overnight tourists, realizing hotel industry turnover of RMB7,665 million, a YoY increase of 12.6%. Guiyang has been rated as the “Best Summer Resort Tourism Destination” across China consecutively for four years. It ranked the 9th in the 2018 List of Global Famous Summer Resort Cities, won the titles of “Best Ecological Tourism Destination” and “2018 Best Quality Tourism City of China National Travel”, and won the title of “2018 Top 10 Famous Festivals” in “China Guiyang Summer Resort Season”, with “Cool Guiyang” city brand widely recognized.

In 2018, Guiyang had a total of 32 scenic spots included into provincial tourism “1+5 100 projects”, including one 5A level scenic spot. Colorful Guizhou “Fengjingyan” Cultural Creative Scenic Spot, Guizhou Liuguang Hot Spring Tourist Attraction, and Qingzhen Xiangchou Guizhou Scenic Spot were all rated as national 4A level scenic spots, raising the number of scenic spots above 4A level to 19. Besides, recently it launched new scenic spots and new programs such as Shanquan Lake Park, Nanshan Post House, Fangzhou Stage, Zhenhua Wanxiang Hot Spring, Nanjiang Water Happy Valley, Colorful Guizhou City Festival Street, Maple Leaf Valley Hot Spring, Oriental Science Fiction Valley, Nostalgia Guizhou and Four-season Guizhou.

4.1 Background of Cooperation between Ctrip and Guiyang City

4.1.1 Overview of Ctrip big data development

Since its establishment in 2015, the Ctrip Big Data Center has integrated data on users, behavior, orders, POI, reviews, collections, etc., of business units, subsidiaries and other companies in the system of Ctrip, and gained insight into tourism destinations from various aspects, including users, public opinions, competing products, related marketing and development opportunities by virtue of in-depth research of such data, in the hope of informing the healthy development of tourism destinations via big data.

On January 19, 2017, the first tourism big data joint lab was established by Ctrip and the China Tourism Academy, the first big data lab of China's tourism industrial circle and academic circle. By virtue of analysis and research of tourism big data accumulated by Ctrip, the tourism big data lab will provide professional data analysis services integrating both market and theory for tourism destinations in various aspects, including tourism industry insight, data sharing, and smart tourism solutions.
Currently, the Ctrip Big Data Center can generate ten billion pieces of data on a daily basis, implying a volume of about 50TB/day, with coverage of 200 million active users within and without the site.

4.1.2 Guidelines for development of big data tourism in Guiyang City

For the purpose of facilitating the development of big data tourism industry of Guiyang City, Guiyang established the Three-Year Action Plan for Big Data Tourism of Guiyang City in 2017, which is scheduled to be continuously implemented for three years, thereby building a tourism big data comprehensive service framework of Guiyang featuring “one center, one window, one network and three systems”, unifying portals, data, interface, deployment, support and application, and forming one-stop smart tourism data platform facing tourists, enterprises and governments. Figure 2 indicates that Ctrip big data tourism resources serve as an essential part of the big data platform of Guiyang.

4.2 Form of Research and Cooperation in Smart Tourism Big Data of the Parties

The cooperation between Ctrip and Guiyang Municipal Big Data Center focuses on a “data support + data application” model, which is implemented with an emphasis on big data interface and big data analysis reports, whereby Ctrip provides industrial operation data and Guiyang City relies on industry management experience application data with an aim to jointly facilitate the development of destination tourism industry.

4.2.1 Big data interface

On the basis of platform transaction data and by virtue of desensitization, screening and classification, Ctrip transmits data output that includes Guiyang’s online tourism customer flow, tourist features, online consumption features, online public opinions and hot tourism products to Guiyang’s smart tourism data platform by developing a customized interface. By visualization processing, Guiyang smart tourism data platform displays such data in a visual manner and distributes to the relevant departments with an aim to guide practical application by data.

4.2.2 Big data analysis report

On the basis of integrating and comparing online operation data of Guiyang, Ctrip has put forward development suggestions by relying on the tourism operation and marketing experience of Ctrip. At the same time, by public disclosure via social media and network news media, it displays content such as Guiyang’s tourism specialty list to provide reference for the operation of...
tourism-related companies, tourist travel, among others.

4.3 Composition and Application Scenarios of the Smart Tourism Big Data System of Guiyang City

Currently, it provides 3 systems, 12 big data modules, over 40 data dimensions and various application scenarios for Guiyang City on the basis of Ctrip big data tourism resources.

At a macro level, it enables an understanding of overall online tourism reception of Guiyang City; at a medium level, it allows an analysis of the distribution patterns and trading structure of online transactions in different business forms such as accommodations, transportation and scenic spots; and at a micro level, it analyzes tourism profiles and tourist travel preference to more accurately identify the demands and behavioral features of different customer groups. Meanwhile, it allows comparison with certain competing destinations, helps facilitate differentiated development deployment, and satisfies diversified tourism demands of tourists, thus providing decision-making basis for refined management, precise marketing and precise deployment of tourism industry resources.

Note: in Figure 4, “tourist age analysis” means tourist age statistics of Guiyang City on the basis of total tourists received; “tourist type distribution” means percentage of tourists of each travel category in tourists received in Guiyang City; “comparison of travel modes of tourists coming to Guiyang” means percentage of tourists of each travel mode in tourists received in Guiyang City; “distribution of transportation modes of tourists coming to Guiyang” means distribution of transportation means utilized by tourists received in Guiyang; “Guiyang tourist flow forecast” means a forecast of tourist flows to Guiyang City in the future; “distribution of origin provinces of tourist to Guiyang City” means ranking of origin provinces on the basis of total tourists received.

Note: in Figure 5, “ranking of competing cities in terms of tourists in scenic spots in latest week” means ranking of Guiyang City and other competing cities on the basis of total tourists in scenic spots in latest week; “ranking of competing cities in terms of services in scenic spots in latest week” means ranking on the basis of overall service scores of scenic spots for the latest week; “preferred itineraries of tourists coming to Guiyang in latest week” means ranking on the basis of tourists coming to Guiyang by itineraries in the latest week; “preferred itineraries of tourists coming to Guiyang in latest week” means ranking on the basis of tourists coming to Guiyang by itineraries in the latest week; “preferred itineraries of tourists coming to Guiyang in latest week” means ranking on the basis of tourists coming to Guiyang by itineraries in the latest week; “preferred itineraries of tourists coming to Guiyang in latest week” means ranking on the basis of tourists coming to Guiyang by itineraries in the latest week; “preferred itineraries of tourists coming to Guiyang in latest week” means ranking on the basis of tourists coming to Guiyang by itineraries in the latest week; “preferred itineraries of tourists coming to Guiyang in latest week” means ranking on the basis of tourists coming to Guiyang by itineraries in the latest week.
4.3.1 Precise marketing tourist group—precisely identifying target tourist groups in marketing and promotion

According to analysis of “tourist profile” features of Ctrip tourism big data: on the basis of the analysis of tourism big data in 2018, domestic source markets of Guiyang City mainly included source markets in the province according to tourist data of last year. Excluding Guizhou, the top 10 provincial-level source markets were Guangdong, Beijing, Sichuan, Zhejiang, Jiangsu, Shanghai, Chongqing, Hubei, Fujian and Yunnan. These 10 source markets accounted for 47.06% of tourists to Guiyang throughout the year and 52.59% of online consumption. To be specific, male tourists accounted for a larger proportion than female in tourists from the key province (Guangdong), the 25-34 age group came as the largest and the most selected hotels are those with price range of RMB170-300. Meanwhile, it disclosed that hot source cities for Guiyang City were: Guiyang, Beijing, Shanghai, Chengdu, Chongqing, Zunyi, Shenzhen, Guangzhou, Wuhan, Nanjing and Liupanshui. And Guiyang City delivered metro and outdoor ads in these cities accordingly. Besides, when carrying out tourism promotion in the key province (Guangdong) targeting at top source cities in 2019, it can find corresponding promotion locations according to tourist features identified by tourist profile, such as white-collar urban business districts, and establish supporting preferential policies, etc., in combination with relevant product itinerary introduction and a tourism album according to popular itineraries of target tourists.

4.3.2 Tourist flow forecast early warning

On the basis of basic data of Ctrip tourism big data, it can obtain data indicators such as total tourist flow, holiday tourist flow and tourist flow based on forecasts of certain models, enabling Guiyang City to carry out peak tourist flow early warning and help the Culture and Tourism Bureau and scenic spots be prepared in advance for reception of peak tourist flow. For instance, by virtue of big data analysis, it can foresee a tourism peak season in the summer holiday of 2018, so the Guiyang Municipal Culture and Tourism Bureau organized all offices and departments to carry out specific response measures, including pre-holiday special market supervision inspection, emergency management and exercise, holiday tourism data operation monitoring and statistical analysis. In addition, it instructed scenic spots to enhance installation of resort and shelter facilities and equipment to ensure a favorable environment for tourists to Guiyang.

4.3.3 Identifying hot serial itineraries

On the basis of statistical analysis of serial itineraries of tourists to Guiyang City from different source markets, and with consideration of a number of data indicators such as number of orders and consumption amounts, it can select serial itineraries popular among tourists from key source markets and issue a data report to provide reference for R&D of itinerary products, among others.

4.3.4 City analysis—maintaining city competitiveness

By virtue of the city analysis module in Ctrip tourism big data, Guiyang City can select competing cities and carry out comparative analysis from various aspects such as comparison of tourist flow, travel features, identity features, hotel and scenic spot service capacity, thereby getting a clear understanding of its advantages and disadvantages in competition, analyzing tourism satisfaction of tourists toward competing cities, selectively enhancing and improving its tourism services.
4.4 Suggestions on How to Use Tourism Big Data to Further Serve the Construction of Smart Tourism City

Development of tourism is in full swing. Sufficient consideration should be given to how to use Ctrip tourism big data to better serve the construction of urban smart tourism. In this regard, several suggestions are given as follows:

4.4.1 Data sharing between departments

Data sharing with public security departments: transmit tourism data to public security departments to carry out timely early warning and help maintain stability;

Data sharing with tax authorities: transmit tourism data to tax authorities to help them be timely informed of integrity violation information about tourism-related companies such as travel agencies.

Data sharing with tourism-related companies: after collecting data, provide industry analysis reports to travel agencies and hotels free of charge about the big tourism environment of Guiyang. And at the same time implement and unify relevant regulations and standards of tourism statistics.

4.4.2 Data feedback to tourism industry

After collecting data from various sources, smart tourism data platform will carry out comprehensive integration and analysis, before giving feedback to various sources to form urban tourist profile data, public opinions monitoring data, law enforcement data, industry development data, etc., in dimensions such as product, marketing and preference. With a focus on tourism administrative management and by virtue of a tourism word of mouth system, it establishes tourism credit “red and black” lists, improves the data construction of tourism enterprises and tour guide credit systems, builds Guiyang’s tourism network service platform, and tries to implement reform of mechanisms and systems of management of free practitioners such as online tour guides and online ride-hailing drivers.

Chapter 4 Endnotes

Helsinki
The Republic of Finland
5.1 Introduction

5.1.1 Basic facts

Located on the shore of the Gulf of Finland, Helsinki is Finland’s capital and its most populous city. Helsinki’s population is approximately 650,058 and it is the country’s most important center for politics, education, finance, culture and research. The Greater Helsinki area is the world’s northernmost urban area with a population of 1.5 million, and it is the EU’s northernmost capital city.

The sea is an essential part of Helsinki’s environment, surrounding the city to the south, east and west. The city has nearly 330 coastal islands, many of which are accessible for recreational use.

5.1.2 Infrastructure for transport and connectivity

Helsinki has excellent transport infrastructure for domestic and international travel. The city is served by Helsinki Airport, located in the neighbouring city of Vantaa, with frequent service to many destinations in Europe and Asia. Around 180 international flights connect Helsinki to more than 140 global destinations every day.

Finnair, Finland’s flag carrier, has more than 80 direct flights a week from Helsinki to 14 destinations in Asia, including six across major cities in China - Beijing, Chongqing, Guangzhou, Nanjing, Shanghai and Xi’an.

The Port of Helsinki is a major sea transport hub, which became the busiest passenger port in Europe in 2017, serving over 12 million passengers aboard 266 cruise vessels.3

Within the city, Helsinki has an excellent public transport system consisting of buses, trams, the metro, local railways and ferry services. Since 2016, there is also a public bike sharing system.

In terms of tourist accommodations, the city has 71 accommodation establishments (63 are hotels) with a total capacity of 10,085 bedrooms (as of 2018).3 In addition, Airbnb has substantially increased Helsinki’s total accommodation capacity with almost 3,000 apartments and rooms available in 2018.3

Helsinki has excellent Internet infrastructure. Large parts of the city center have free Wi-Fi, as do many restaurants, cafes and bars, and nearly all hotels.

5.1.3 Tourism flows

Helsinki recorded 4.2 million overnight stays in 2018, having crossed the four million mark for the first time in the previous year. Foreign demand has contributed significantly to this growth, accounting for over one-half (55%) of all overnight stays in 2018.

The top six international source markets for Helsinki are Russia, Germany, the USA, Great Britain, Sweden and Japan, followed by China in the seventh position. Chinese visitors to Helsinki have more than doubled (+125%) in the last five years, registering over 113,000 overnight stays in 2018.4

5.1.4 Destination management

Helsinki Marketing (formerly Visit Helsinki) is the marketing company owned by the City of Helsinki and is responsible for Helsinki’s operative city marketing and business partnerships.

Helsinki Marketing’s scope of operations covers marketing activities related to tourism, congresses, events and business promotion, application procedures for major events and congresses, as well as tourist information services. It works in close cooperation with the departments and units of the City of Helsinki.

5.2 Open data ecosystem - the backbone of Helsinki’s City Strategy

The Helsinki City Strategy 2017–2021 envisions Helsinki as the most functional city in the world. In pursuing this vision, it seeks to create the best possible urban conditions for its residents and for its visitors.3

One of the key objectives defined by the strategy is for Helsinki to become the world’s best city in utilizing digitalization.
Already recognized as one of the leading cities in the world in terms of smart city governance, the City of Helsinki’s operating model is based on openness and transparency, implementation of accessible e-services and innovative use of mobile technology, artificial intelligence and robotization.

5.2.1 Helsinki Region Infoshare-the open data ecosystem

The Helsinki Region Infoshare (HRI) is an open data ecosystem set up by Forum Virium (https://forumvirium.fi), a private non-profit organization owned by the City of Helsinki, in collaboration with Helsinki’s Urban Facts department, to make regional information quickly and easily accessible. The city has worked systematically since 2009 to facilitate access to public information for use by the private sector. This work has made Helsinki a model city for open data, which can enable transparency in public administration, create new digital practices and present opportunities to software developers to design new products.

The HRI data catalogue provides fast and easy access to almost 650 datasets from the cities of Helsinki, Espoo, Vantaa and Kauniainen, across different categories such as local government, the economy and taxation, environment and nature, traffic and tourism, culture and recreation, etc.

The free-to-use data has already been utilized by developers to develop various applications and visualizations across diverse categories: the HRI showcase gallery (https://hri.fi/data/en_GB/showcase) lists over 200 apps and services created with the use of open data.

Additionally, some city authorities and companies such as the Helsinki Regional Transport Authority (HSL), the Helsinki Region Environmental Services Authority (HSY) and Helsinki Marketing also maintain open data services on their websites, for public access on a non-commercial basis.

Mention should also be made of Traffic Management Finland’s open data service Digitraffic (www.digitraffic.fi), which offers real time road, rail and maritime traffic information across the country.

5.2.2 MyHelsinki.fi smart tourism initiative

Helsinki Marketing, the City of Helsinki’s marketing arm, has set up the MyHelsinki Open API (http://open-api.myhelsinki.fi/), which is an excellent example of a smart tourism initiative that encourages the usage of open data for both commercial purposes as well as for the city’s development. It can be used by experienced project development teams and new app developers alike.

The MyHelsinki Open API is an open interface of three databases that offer up-to-date information about places, events and activities in and around Helsinki. The data is sourced from:

1. Helsinki Marketing’s database of places.
2. The Linked Events database maintained by the City of Helsinki.
3. The content management system of the MyHelsinki service.

The MyHelsinki.fi website holds the best tourism related information available from the City of Helsinki. Data is available in Finnish, English, Swedish and Chinese, and can be filtered by visitors based on categories or distance for example.

Objective

Helsinki Marketing’s goal was to design a service that would help people find the best of Helsinki’s services and offerings in a personal, inspiring and mobile-friendly package, and to further enhance Helsinki’s international visibility and appeal.

Strategy

The strategy was simple: MyHelsinki.fi (www.myhelsinki.fi/en) should help visitors find the best local experiences in Helsinki and the recommendations should be trustworthy.

Based on the belief that visitors are interested in the same things as locals, the

Figure 5.3 MyHelsinki.fi

Source: MyHelsinki.fi website
core strategy was to have people share their favorite places and events in Helsinki; this led to the website’s service promise, “Your local guide to Helsinki”.

Implementation

MyHelsinki.fi is based on content and recommendations by locals. Equally, all concepts produced by Helsinki Marketing such as #MyHelsinki Residence, a concept inviting international influencers to experience the city, rely on genuine reviews and recommendations.

One of the key features of the website is My Helsinki lists, a visual map of favorite places in Helsinki that can be created and shared by anyone. My Helsinki lists are a way for locals to let the world know about their city. Additionally, the open data enables local businesses in Helsinki to gain visibility in international sales and marketing channels.

Results

The site has enjoyed phenomenal growth in the number of visitors since its launch:

- Site visit increased 1935% within the first six months of its launch.
- Overall, over 3.5 million annual users in 2016 and 2017.
- Visitor return rate of 30%, reading approximately three to four articles per session.

My Helsinki was launched in August 2017, when existing social media channels changed their names and content strategy from Visit Helsinki to My Helsinki. The main channels are @myhelsinki on Instagram which has attracted 132,000 followers and over 367,000 posts, and Facebook which has over 33,000 followers to date. Both channels enjoy an organic growth of 300-600 followers a week.

As the development continues, the service aims to offer users personally tailored recommendations based on user data.

Sustainable tourism initiative

Helsinki Marketing will launch a new service initiative called Think Sustainably on MyHelsinki.fi in the summer of 2019; it will offer consumers, residents and visitors alike the ability to search for sustainable restaurants, accommodations, activities and events in the city. The service, developed in collaboration with local interest groups and sustainability experts, is based on sustainability criteria tailor-made for Helsinki.

Notably, most of the hotels in Helsinki have been granted an eco-certificate, with more than 75% of the hotel rooms in Helsinki being certified as environmentally friendly. Helsinki is also involved in a pilot project for the Sustainable Finland concept developed by Visit Finland.

5.2.3 New business models and smart tourism technology tools

Free access to information available as open data has led to the creation of new business models and innovative digital services, much to the benefit of Helsinki’s local residents and visitors alike. While some projects (mainly non-commercial) are currently at an experimental stage, some others have been developed commercially and are already available in the market.

The Smart City Guidance project

Helsinki, along with the cities of Turku and Tampere, is building a new concept of Smart City Guidance (https://itsasign.fi). The project’s focus is one way for residents and visitors to find information to improve service accessibility aside from traditional signpost guidance to new innovations and guidance from large crowds during festivals and mass events.

Over 30 rapid experiments and pilot projects are currently ongoing in the three cities, all in collaboration with local entrepreneurs and companies.

Rapid experiments started in Helsinki in autumn 2018. The mobile guidance service will be piloted in the summer of 2019:

- During the pilot, visitors to the Market Square area and surrounding islands...
will be able to test solutions and to give feedback.

- The pilot will test congestion management, offering visitors alternate routes to avoid areas with high congestion via the Market Square mobile application.
- The measurement will be based on the occurrence of Bluetooth signals.

**Mobility as a service app**

One of the most innovative business models developed using open access data is Whim, a mobility-as-a-service app, launched commercially in 2017.

Developed by Helsinki-based start-up MaaS Global, the world’s first MaaS (Mobility as a Service) operator, the award-winning app interconnects many of the city’s mobility options under one subscription and within a single app.

With the Whim app, users can combine, plan, and pay for public transport, taxis, car rentals, car sharing, and city bike trips on the go.

Whim is currently live in Helsinki, Birmingham, and Antwerp; it is targeted to be available in ten cities by the end of 2019 and in over 100 cities globally within five years.

The Finnish startup is the winner of the European Startup Prize for Mobility, the largest European contest for startups that specialize in mobility and that incorporate sustainable development.

**Impact of the Whim app**

Since its launch in 2017, Whim’s users have made over four million trips using different modes of transportation. Independent third party analysis of usage data shows that Whim users ride public transportation significantly more (73% of all trips) compared to Helsinki residents (48% of all trips). In addition, Whim users are multimodalists, using both bicycles and taxis to solve the first/last mile problem more often in comparison to the typical Helsinki resident.

These initial findings suggest that MaaS allows more holistic use of existing public transportation systems and offers an innovative alternative to owning a car.

**Other operational digital platforms**

Several other operational digital platforms and applications are available to enhance a visitor’s experience in Helsinki. Some of the more prominent ones include:

- Discover Helsinki (https://discoverhelsinki.fi)—a travel app designed to help experience Helsinki like a local.
- Blind Square (www.blindsquare.com)—the world’s most popular accessible GPS application for the blind and visually impaired.
- Virtual Helsinki (www.virtualhelsinki.fi)—unique virtual reality (VR) city experience created in high-quality 3D.

Developed by the City of Helsinki with its partner VR-studio ZOAN, Virtual Helsinki lets would-be tourists wander a digital twin of Helsinki built using 3D modelling. The aim is to profile Helsinki as a centre of VR/AR expertise, as well as to attract a million virtual visitors to Helsinki in 2019.

**5.2.4 Additional smart tourism tools**

New smart tourism technology tools are constantly being developed and launched in the City of Helsinki. Examples include:

- Doerz—a platform and community that connects travellers with locals.
- Chido—a platform to search and book activities, courses and events by location, category or date.
- Wowanders—an AI powered travel diary app.
- Tripsteri—mobile media: online travel guide, guidebook series, tourist podcasts and an award-winning international tourism application.
- Julia, Train Display, Tässä.fi and Get to Finland—transportation apps for rail and road traffic information and management.
5.3 Co-operation platforms with Chinese companies

In cooperation with the Chinese tech giant Tencent (owner of WeChat), Helsinki has developed the first city mini program within WeChat, an all-in-one app with over one billion users. For Tencent, Helsinki is serving as an intelligent tourism model for China’s outbound tourism.

5.3.1 WeChat Helsinki mini program

WeChat’s MyHelsinki mini program serves as a local guide offering Chinese independent travellers a whole new travel experience using the MyHelsinki Open API. Chinese visitors can now find the most relevant information on Helsinki in Chinese:

- Discover the best sights, restaurants and activities in Helsinki.
- Find information about the most important things.
- Get around Helsinki on foot or by public transportation and taxis.
- Pay as you go for activities, sights, restaurants and transportation.

As of September 2018, Finnair has joined the program to provide additional user-centric travel solutions in the WeChat mini program ecosystem.

WeChat Pay/AvainPay

WeChat Pay is the fastest growing mobile payment service in China. With WeChat Pay, users can make payments quickly and conveniently in RMB by simply scanning a QR code, without having to exchange currency or withdraw cash.

Helsinki company Avaintec has partnered with Tencent to promote WeChat pay in Nordic countries. AvainPay links local businesses with Chinese travellers within the Mini program ecosystem.

To serve Chinese customers even better, Avaintec has also partnered with City Digital, provider of the online restaurant booking service TableOnline. Chinese tourists will soon be able to find, book and pay for their meal using TableOnline service in over 400 restaurants in Finland and Estonia with WeChat Pay.

Impact

WeChat MyHelsinki mini program has been launched as a beta version in several stages during 2018 and January 2019. So far, the feedback from user validations with Chinese visitors has been extremely positive. Users have appreciated the ability to discover varied activities and get around conveniently in Helsinki with the help of their WeChat app.

5.4 Helsinki’s sustainability policies and action plans

Environmental sustainability

In its bid to become the most functional and sustainable city in the world, the City of Helsinki’s environmental policy has set its long term goals for 2050, and for the medium term in 2020 under various categories such as climate and air protection, noise control, biodiversity protection, etc. Some of the action plans and projects are highlighted below:

Climate protection: Helsinki aims to be carbon neutral by 2035. The Carbon-
neutral Helsinki 2035 plan contains 147 actions which are at different stages of implementation.

Air protection: HOPE (Healthy Outdoor Premises for Everyone), a new EU-funded project, has been initiated to provide citizens with real-time data on the pollution levels in their neighborhood or route to work through ‘Green Path’, a mobile phone app air quality route planner.10

Biodiversity: Helsinki monitors its natural areas with a biodiversity protection action plan that includes specific measures to secure the city’s biodiversity.

Extensive environmental statistics are available on the Helsinki Region InfoShare and include the key indicators marking attainment of sustainable development goals. The data supports many facets of environmental monitoring and reporting.

Sustainable transport

Encouraging use of eco-friendly, sustainable modes of public transport by its citizens (and visitors) is a major goal for Helsinki, which aims to be car-free by 2025.

Initiatives to foster adoption of eco-friendly transport choices by commuters include:

- Construction of Park-and-Ride facilities for bicycles at high traffic junctions.
- Launch (pilot test currently) of electric driverless minibuses on public roads.
- Support of companies developing Mobility as a Service (MaaS) concept offerings.

Helsinki for All accessibility plan

The city’s accessibility plan, known as Helsinki for All, is the foundation for an accessible Helsinki.11 It requires that all public areas are constructed and remodelled for accessibility, all new hotels and restaurants must install facilities for the disabled, and public transportation vehicles be accessible by wheelchair.

Helsinki is also part of a consortium of Finland’s six largest cities who together have facilitated an open innovation platform called ‘The Six City Strategy’. This platform consists of jointly developed smart solutions and the implementation of experimental projects intending to tackle the challenges related to sustainability in urban environments.

Above all, Helsinki is committed to sustainable tourism and adopts the cities’ joint declaration on sustainable urban tourism, published at the meeting of the World Tourism Organization (UNWTO) in Lisbon on April 5th, 2019.
Kunming, the capital of Yunnan Province, enjoys the reputation of the “City of Perpetual Spring” and the “Flower City”. It is a famous national historical and cultural city, an important tourism and trading city in China and also one of the important central “central city in Western China” cities in Western China. In addition to the well-known climate advantages and world-famous flowers credited with its city name card, Kunming also boasts profound cultural brand foundations, including the Yunnan Military Academy, Former Site of National Southwest Associated University, Cuihu Lake, Daguan Pavilion, Ancient Town of Guandu, Ancient Dian State in Jinning District and Hometown of Zheng He. In terms of tourism service facilities and service capacity, there are more than 7,400 accommodation facilities with a total number of about 420,000 beds; 292 travel agencies with 11,529 registered tour guides; 15 tour bus companies with 2,156 tour buses and 23 scenic spots at the national A-level or above in Kunming.

6.1 Challenges Facing Kunming’s Tourism Industry

Kunming’s tourism industry has been improving on account of its new infrastructure, reasonable product structure, and its significantly enhanced levels of service. However, despite these overall positive developments, Kunming’s tourism industry also faces problems that cannot be ignored, such as “unreasonably low-priced tour groups”, (a package tour that is intentionally underpriced and whose members are then subjected to a barrage of mandatory shopping) a type of “forced consumption”. Tourism conflicts have been frequently exposed, and been reported by the major media outlets. The root cause for these issues is that Kunming relies too much on traditional tourism resources, but has failed to achieve incremental development of the industry by developing new tourism resources. There are also some careless omissions in the comprehensive management of work safety. For example, equipment and facilities in some hotels, shopping malls and scenic spots are old and operated in poor condition by enterprise managers who put more emphasis on efficiency and less emphasis on investing in infrastructure.

6.1.1 Traditional resources are to be upgraded and innovative incremental resources are underdeveloped

In Kunming, many scenic spots such as the Daguan Pavilion, Yunnan Military Academy and Golden Hall have a sound brand foundation, but fail to find a good combination point integrating historical and cultural brands with the tourism sector. Secondly, the layout and garden design of many scenic spots seem to be old and monotonous over time, and the management is not in place. At the same time, some newly developed tourism projects encounter problems such as a lower starting point of planning poor initial planning and incomplete construction, are left unfinished failure to achieve the goal of quality development and incremental development.

6.1.2 It is difficult to optimize the tourism market’s order governance and tourism’s economic structural transformation

The difficulties in optimizing the tourism market’s order governance and tourism’s economic structural transformation in Kunming mainly lie in how to better combine the temporary solution with the
fundamental solution and how to give better play to the initiative of main market players. In recent years, Kunming City and even Yunnan Province as a whole have been committed to optimizing the tourism market’s order governance and tourism’s economic structural transformation. However, traditional administrative means are not very effective. It is urgent to upgrade both service and management concepts and to introduce scientific and technological means to inject new impetus into tourism development.

Since the end of 2017, Kunming smart tourism has entered a new stage under the “Tour with Just a Mobile Phone” overall planning, with the launch of the “Tour around Yunnan with Just a Mobile Phone” by Yunnan Province. After construction and operation for more than a year, the project has achieved certain results and promoted the tourism development of Kunming. Based on the case of Kunming’s smart tourism construction benchmark project, i.e. the “Tour around Yunnan with Just a Mobile Phone” project (Kunming), this paper will analyze the inspiration for and the significance of smart tourism construction on urban tourism development.

6.2 Construction Aspects of Kunming’s “Tour around Yunnan with Just a Mobile Phone” Project

Smart tourism is a new opportunity to develop the tourism sector. The growth of China’s Internet industry has also injected new impetus and vitality into the development of urban smart tourism. In this context, Yunnan Province actively explores the “Internet + tourism” practice and spares no effort to promote the construction of the “Tour around Yunnan with Just a Mobile Phone” project. Having launched the “Tour around Yunnan” App firstly in China, Yunnan is focusing on reforming its tourism resources and products, reconstructing its integrity and complaint system, rebuilding market rules and order, and reshaping its tourism brand and image to promote the comprehensive transformation and upgrading of its tourism industry with full strength.

The “Tour around Yunnan with Just a Mobile Phone” is a “China-first and world-class” digital platform for region-wide smart tourism built by the People’s Government of Yunnan Province and Tencent Cultural Tourism using the Internet of things, cloud computing, big data, artificial intelligence and other technologies. This platform is designed to boost transformation and upgrading of the tourism industry as well as innovation and practice in Yunnan’s digital economy in all respects, and to build an intelligent, healthy and convenient region-wide tourism ecology in Yunnan.

6.2.1 Overview of the “Tour around Yunnan with Just a Mobile Phone”

The “Tour around Yunnan with Just a Mobile Phone” APP was officially launched on October 1, 2018. With “one center and two platforms”, the APP integrated advanced technologies from the Internet and IT fields, realized the integration of Internet tourism and tourism public services, improved the tourism industry’s online rate and restructured the government’s management mode, so as to provide technical guarantees for the comprehensive realization of a “digital Yunnan”. Besides, the APP also achieved the “free tourists’ experience and government services everywhere” with the consumption integrity system and quick complaint management system.

1. Big data center

Yunnan’s big data center is the super-brain driving smart tourism throughout the province. It is a region-wide tourism system utilizing big data and artificial intelligence to promote the transformation of tourism
in Yunnan. Information technology and the early collection and management of its data constitute the basis of smart tourism, and the mining of tourism big data is its core. This multidimensional data application system combines user portraits, LBS location data, payment data and data visualization that helps scenic spots and local governments to better collect tourism-related big data, resulting in a super-brain of province-wide smart tourism.

(1) Digital identity system

Used for user behavior understanding, identification, tracing, precise promotion experience and service guarantee, for example, smart tourism route planning, push of local characteristic cultural and tourism products, multi-dimensional digital content to assist decision-making, etc.

(2) Digital consumption system

Used for coupling of payment, marketing and service behaviors with consumption data, and for multidimensional integration.

(3) Digital integrity system

Used to promote the construction of an all-win integrity system for tourists, businesses and governments, to protect the rights and interests of the three parties. The end-to-end complaint service system simplifies the complaint process, shortens the time limit to address complaints, and it accurately refers the pertinent department to properly address the complaint, thus creating a holistic, tourist-centered system.

(4) AI service system

Used to enhance tourists’ travel experience via intelligent services such as smart guide and AI flower and attractions identification.

2. Integrated tourist service platform

The integrated tourist service platform makes it a reality for tourists to “tour around Yunnan” with just a mobile phone and connecting tourists with honest merchants and relevant services regarding “food, accommodations, transportation, travel, shopping and entertainment”, to let tourists do whatever they want before, during and after a tour, whenever and wherever possible.

As a region-wide tourism smart platform jointly built by the Yunnan Provincial Tourism Development Committee and Tencent, the “Tour around Yunnan with Just a Mobile Phone” project relying on the “Internet + tourism services” provides tourists with Internet products including “smart route”, “cashless payment”, “electronic invoice”, “face recognition”, “smart tour guide” and “integrity system” via official APP, WeChat Official Account and WeChat applets. It fully covers various needs of tourists regarding “food, accommodations, transportation, travel, entertainment and shopping” in Yunnan as well as their needs before, during and after their tour, ensuring that tourists travel with ease and the process is well-administrated by the government.

3. Integrated government management platform

The integrated government management platform makes it a reality for the governments to “govern Yunnan” with just a mobile phone and provides services to the province, cities, prefectures, counties and tourism-related businesses, and achieves intelligent industry regulation to make government services and market regulation present everywhere.

6.2.2 Construction content of Kunming’s “Tour around Yunnan with Just a Mobile Phone” project

Leveraging the “Tour Yunnan with Just a Mobile Phone” project, Kunming’s efforts focus on hardware, software and management. Driven by reform, innovation and integrated development, Kunming comprehensively promotes supply-side structural reform of the tourism sector, and boosts transformation and upgrading regarding five aspects: destinations, products, public infrastructure, tourism management services and digitization. This will enhance attractions and the tourism industry’s core competitiveness, helping it become an important pillar industry, enabling great contributions during the “13th Five-Year Plan” period.
As of June 2019, 14 districts and counties and 41 scenic spots optimized the tourism business card and launched 99 tourism slow live streams, 12 scenic spots installed and ran the face swiping for admission gate machine and 109 restrooms undertook intelligent upgrading and reconstruction in Kunming. And the integrity evaluation system covered 1,894 hotels, 2,832 restaurants and 279 travel agencies.

1. Pre-tour: The most comprehensive and authoritative information about tourism in Kunming

Upon launch, the “Tour around Yunnan with Just a Mobile Phone” project has covered 23 scenic spots above 3A level in Kunming at present. In addition to two 5A-level scenic spots, i.e. the Yunnan Stone-Forest Scenic Spot and Expo Park, defined according to the standard, as well as nine 4A-level scenic spots including the Jiuxiang Scenic Area, Xishan Scenic Spot, Yunnan Ethnic Village, Daguan Park, Jindian Park, Ancient Town of Guandu, Wildlife Park, Yunnan Ethnic Grand View Garden and Jiaozhi Snow Mountain Scenic Spot, Kunming is also going to launch 12 3A-level scenic spots, including the Cuihu Yunnan Military Academy, Heilongtan Park, Panlong Temple, Classic Holiday Valley, Yunnan Restaurant, Qinglong Gorge, The Aqua, Xinghe Hot Spring Town, Shilin Wanjiahuan Blueberry Manor, Yanquan Temple and Norinco Group Touring Car Hot Spring Center and Kunming Dounan Flower Market.

2. On-tour: Scenic spot-wide digital tour guide improves the whole-journey smart experience of tourists

(1) Public service system construction

In 2018, Kunming completed the construction of 164 toilets at tourist attractions bringing the total to over 800 toilets for tourists launched on the “Tour around Yunnan with Just a Mobile Phone” APP. The construction of smart tourist toilets has been further accelerated. Completing the city card, scenic spot card, hand-drawn map, AI attractions identification, scenic spot gate machine transformation, smart parking lot, integrity evaluation and slow live construction of the “Tour around Yunnan with Just a Mobile Phone” project, the tourism public service system is shifting from offline to online services.

(2) Launch of “all-purpose face swiping” smart service

Kunming City organized tourism, public security and other relevant departments to carry out a special study to explore the implementation of face swiping for check-in function based on the hotel check-in function...
in management platform and data. A number of qualified star hotels including Sofitel Hotel were selected as pilot hotels to promote the utilization of “all-purpose face swiping” smart service function of the “Tour Yunnan with Just a Mobile Phone” platform, mainly including face swiping for admission, face swiping for check-in, and face swiping for bus riding.

(3) The freshest sightseeing spots with new “featured routes, destination”, etc.

On the basis of the provincial standard, Kunming also increased the number of top-quality featured tourism destinations, special tourism products, featured star hotels, key shopping enterprises and key cultural and tourism enterprises, public services according to the Breakdown Table, to fully cover the “food, accommodations, transportation, travel, entertainment and shopping” needs of visitors to Kunming.

(4) “Top-quality featured tourism destinations”

Visitors to Kunming will be advised to visit the featured towns, traditional characteristic villages and urban farms identified and published by the Kunming Municipal Commission of Development and Reform, Kunming Municipal Bureau of Housing Urban-Rural Development and Kunming Municipal Agricultural Bureau respectively, as well as the 1-5 star rural tourist spots assessed by the tourism administration department.

(5) “Special tourism products”

Based on new forms of tourism such as individual travel by touring car, low-altitude tourism, sports tourism, hot spring health preservation holiday tours and festival tourism, visitors are recommended to take Kunming’s self-driving touring car camp, trans-provincial self-driving travel routes including Yunnan-Tibet route, Yunnan-Chongqing route, Yunnan-Sichuan route, Yunnan-Guizhou route and Yunnan-Guangxi route, provincial self-driving travel routes including Central Yunnan self-driving circle line and red land self-driving circle line, outbound self-driving travel routes including Kunming-Bangkok route, Kunming-Yangon route and Kunming-Hekou route, Haigeng Park low-altitude tourism, sports tourism bases including Wumeng Peak Sports Park of Dongchuan, Changhu Lake of Shilin County, Caohai (Grass Sea) of Dianchi Lake, brand events including Gryffindor national cycling competition, Shanghai Cooperation Organization Marathon and Dianchi Lake Rowing, hot spring health preservation holiday tour projects including Brilliant Resort And Spa, Spring Soul Garden Spa & Resort, Anning Jinfang, Xundian Xinghe Hotspring SPA Holiday Hotel and Ancient Dian Kingdom Culture and Tourism Town, ethnic culture festival activities including the Water-Sprinkling Festival, the Torch Festival and the Double Third Day, as well as special cultural festival products such as the Flower Street Festival, Xundian Beef Cattle Food Culture and Tourism Festival and Lizigou Potato Festival of Dongchuan.

(6) “Accommodation, transportation, entertainment and shopping”

In “transportation” respect, data on passenger transport by train, high-speed rail, tour bus, subway, bus, taxi, car rental companies and waterway transportation in Kunming is included, such as number of trains and passengers from and to each railway station in the jurisdiction of Kunming every day, information about bus frequency, routes, running time, ticket prices, stop and real-time vehicle operation.

In regards to “accommodations”, static
information such as star rating, address, location, telephone and graphic introduction of star hotels and characteristic hotels in Kunming as well as dynamic information such as the number of check-in guests and occupancy rate is included. In addition, well-known hotel brands and groups at home and abroad will be introduced to Kunming, and a number of homestay inns and health preservation resort hotels with distinctive characteristics will be built to highlight the health and livability advantages of Kunming, so that the guests coming to Kunming can have a good rest. In response to increasing personalized travel demands of visitors, Kunming, relying on its geographical advantages, will also increase its international routes to key tourist source countries, open up traffic hubs to scenic spots or employ circle loop trains among scenic areas and create boutique road trip routes and camp construction, so as to make it convenient for tourists from home and abroad to visit and tour Kunming.

In terms of “entertainment”, cultural and tourism enterprises such as performing arts venues, cinemas, theme parks and KTV in Kunming are recommended.

In terms of “shopping”, shopping enterprises such as chain (large) supermarkets, drugstores and shopping centers in Kunming are recommended.

Besides, Kunming has also integrated public service information into the platform, including emergency public service information, expressway service stations, gasoline stations, traffic notices, medical and vehicle rescue systems, so that tourists can have a more enjoyable and comfortable tour in Kunming.

3. Post-tour: A third-party evaluation mechanism is established to build an integrity system

Focusing on the construction needs of the “Tour around Yunnan with Just a Mobile Phone” platform, a third-party integrity evaluation mechanism has been established, and a continuous evaluation method with the basic framework of “prior commitment + post-verification + negative list management” has been developed. Through the “Tour around Yunnan with Just a Mobile Phone” travel-related enterprise integrity index evaluation system, efforts have been put to promote the development of an integrity system for travel agencies, hotels, scenic spots and other tourism elements. Currently, there are 2,745 catering enterprises, 1,908 hotel enterprises, 15 AAA-level tourism passenger transport enterprises and 21 car rental enterprises getting ready for operation. Efforts have been made to implement the system of a red and black list of travel agencies, branches and practitioners, and make good data sharing and work connections with the credit management system of market players and the joint punishment mechanism for dishonesty, so as to ensure that a system of joint disciplinary actions is in place. Through the application of electronic contract transfers, data interfaces of systems such as the Kunming digital tourism platform, the Yunnan tourism market supervision platform, provincial “Tour with Just a Mobile Phone” platform and electronic contract certification of the Ministry of Culture and Tourism are integrated and shared, so as to realize the centralized application of tourist evaluation data.

4. Foundation: Efforts are focused on improving construction of supporting infrastructure

During the smart tourism construction, Kunming City optimized its network infrastructure. Three operators conducted a placement test on the network coverage of A-level scenic spots, boutique self-driving routes and important campgrounds (?) in Kunming, and carried out supplementary construction for network coverage of key areas such as scenic spots. No effort was spared to ensure the network coverage and operation of segments of the “Tour around Yunnan with Just a Mobile Phone” platform. Efforts were made to complete the 4G network coverage optimization of 4A-level and 5A-level scenic spots, network coverage test of 11 3A-level and other lower A-level scenic spots, constructed 34 capacity expansion base stations, and plan to build 20 new base stations and optimize 43 base stations. Work to conduct free Wi-Fi construction in 294 key public areas and deploy 4,164 AP hotspots was done. In addition, there are 73 key public areas with 1,824 AP hot spots under construction, covering eight self-driving tour camps.
6.2.3 Construction results of Kunming’s “Tour around Yunnan with Just a Mobile Phone” project

On October 1, 2018, the “Tour around Yunnan with Just a Mobile Phone” platform was officially launched. In the context of leveraging the key action points of the “Tour around Yunnan with Just a Mobile Phone”, Yunnan’s tourism market underwent its “hardest-ever” regulation and remediation for nearly two years. In 2018, the national tourism complaint platform accepted 780 complaints from Yunnan, down 53% year on year and falling from the 6th to the 21st in China (Yunnan took the first place in terms of the complaint rate for three consecutive years before 2018).

In 2018, Kunming’s total tourism revenue reached RMB218.008 billion, up 35.52% year-on-year, accounting for 24.25% of Yunnan’s total tourism revenue; and received 161 million tourists in total, up 20.32% year-on-year, accounting for 23.4% of Yunnan’s tourist reception.

6.3 Experience learned from Kunming’s “Tour around Yunnan with Just a Mobile Phone” project

In the process of smart tourism construction, Kunming, relying on the “Tour around Yunnan with Just a Mobile Phone” project, has realized the integration of smart tourism service with management and marketing; the integration of culture and tourism; the integration of culture and science and technology, providing a case for other cities or regions in China to refer to in regards to smart tourism construction.

6.3.1 Organizations are required to be defined for construction of smart tourism

In the process of smart tourism construction, Kunming (led by People's Government of Yunnan Province) set up a leading work group for the “Tour with Just a Mobile Phone” project, which was in command of main leaders, with members of relevant units of full-time staff working according to the division of responsibilities, so as to accelerate the project’s implementation and construction. At the same time, efforts have been made to establish and improve the work promotion mechanism, to further strengthen the coordination ability of the leading work group and to accelerate the integration and construction of smart cities, smart tourism and the “Tour with Just a Mobile Phone” project.

6.3.2 Construction of smart tourism cannot be done without financial guarantees

The “Tour with Just a Mobile Phone” project construction is a complicated, systematic project, involving data access and digital applications, government administration and enterprise services, tourist experience and platform matchmaking, etc.. Efforts to set up the supporting construction funds to ensure that full funds are available in a timely manner, to make sure that all the given tasks can advance smoothly and be carried out in all respects. During the “Tour around Yunnan with Just a Mobile Phone” project construction in Kunming, the project construction was divided into data acquisition, management platform, service platform, marketing platform and foundation support system. Among these five parts, the data collection, management platform and foundation support system were funded by government funds, while the building of the service platform and marketing platform was funded by enterprise market investment.

6.3.3 Top-level design is indispensable for construction of smart tourism

Urban smart tourism construction is a systematic project. It is a comprehensive work involving tourist services, government regulation, market supervision and industry development guided by the overall strategic direction of urban tourism development.

The top-level design of Kunming’s smart tourism can be traced to the same origin of Yunnan’s “Tour around Yunnan with Just a Mobile Phone” project. After fully absorbing the experience of the “Tour around Yunnan with Just a Mobile Phone” project, the application mode of “multiple levels and multiple entrances” should be adopted, in order to avoid repeated investments and achieve effective links with investments in various cities, districts and scenic spots. Based on the differences in tourism resources and their importance in different regions, this application mode is designed to better fit the usage habits of local tourists, and achieve a seamless connection with the construction of smart cities.

6.3.4 Connecting external resources enables smart tourism

The “Tour around Yunnan with Just a Mobile Phone” project, which covers Kunming, is jointly built by the People’s Government of Yunnan Province and Tencent, a large Internet company in China. The project features the rich tourism resources and resource endowment of Yunnan and the attention of the People’s Government of Yunnan Province, as well as a number of internet-enabled functions. The platform uses a more open and efficient cooperative service system, covering the OTA application, map application, information website and other segmented industry platforms and multi-dimensional data analysis technology, so as to truly realize the sharing of innovative resources across the network.
6.3.5 Construction of smart tourism cannot be done without continuous operation

Besides, the key to successful application of the smart tourism project lies in operation. In the later stages of project construction, a range of work, including data updates, system maintenance, complaint handling, merchant services and tourist consulting, remains to be done. A local professional company responsible for operation and maintenance is required to be formed to take charge of the implementation of localized services, and the operation work can be done through enterprise investment. The investing enterprises can receive income from e-commerce operation as returns on investment, or directly obtain returns on investment exit from later integration with the smart city project.

6.3.6 Demonstration is necessary for the construction of smart tourism to spread

The construction of smart scenic areas in the Shilin National Scenic Area, Expo Park, and Yunnan Ethnic Village, in Shilin County as a demonstration area for the “Tour around Yunnan with Just a Mobile Phone” project, it focused on the “Shilin Integrated Platform for Smart Tourism” project and drove the smart development of region-wide tourism in Shilin, smart tourism construction, and an important part of Yunnan’s “Tour around Yunnan with Just a Mobile Phone” project big data platform. On account of its high-level coordination and integration, it established a set of patterns that can be promoted in respect planning, design, construction.

Chapter 6 Endnotes

1 Region-wide smart tourism: Region-wide smart tourism is to get through the data link of all smart devices and information platforms by deep integration of the Internet of things, cloud computing, artificial intelligence and other technologies, facilitate the formation of big data, promote the highly smart development of scenic spots, tourism enterprises, administrative areas and even the tourism industry of the whole country and make comprehensive innovations in tourism service, marketing and management.
MADRID
The Kingdom of Spain
7.1 INTRODUCTION: Basic Facts and Tourism

Spain’s capital Madrid is in the heart of the Iberian Peninsula. It is both the seat of government and the residence of the Spanish monarch, and it is Spain’s political, economic and cultural center. Madrid is Spain’s largest autonomous municipality with a population of approximately 3.3 million, and 6.5 million reside within its metropolitan area. Although the site of the modern city has been occupied since prehistoric times, it was not until the Muslim era (9th century) that the existence of an established settlement can be historically documented. Madrid’s population grew rapidly after it became the capital in 1561. Its industry started to develop on a large scale in the 20th century (it is second only to Barcelona) and its specialty is high technology; however, in recent years Madrid’s economy has mainly been based on its service sector.

7.1.1 Transport and connectivity infrastructure

Transport and connectivity infrastructure is one of the key factors for any tourism destination’s development. Madrid is well connected and situated at the nexus of national highways, air transport and railways. In 2018, Madrid’s Adolfo Suarez airport received a record number of passengers, 57.9 million, and an increase of 8.4% over 2017. International passengers reached almost 42 million, totalling 8.8% more than the previous year, making it the fifth most important airport in the European Union. Madrid maintains direct links to a network of cities with AVE (high speed train) and RENFE for the improvement of railway connectivity.

7.1.2 Hotel Occupancy

Madrid has 793 hotel establishments according to data from the INE Hotel Occupancy survey completed in 2018: Bed capacity reached 85,418 (2.2% more than 2017), 62% of which is in the luxury, high-end category.

Globally urban tourism is booming and Madrid is a top destination for several reasons. Visitors enjoy a unique lifestyle blending modern, cosmopolitan flair along with a rich, cultural heritage. Not to be missed are the excellent local and international gastronomy, a wealth of leisure activities, and world-class shopping—all set in a beautiful landscape.

7.1.3 Visitors

In 2018, the city of Madrid recorded 10.2 million overnight stays, an increase of 1.6% compared to 2017. Accommodation was split between 61% International and 39% Domestic. The average daily expenditure increased by 10.2% to 243 Euros. Expenditure in Madrid province was 9.322 M Euros, an increase of 5.3% compared to 2017.

Table 7.1 highlights of Madrid in 2018

<table>
<thead>
<tr>
<th>VISITORS</th>
<th>TOP SOURCE MARKETS</th>
<th>TOP 5 BY GROWTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.21 M.</td>
<td>USA 681.300</td>
<td>CHINA 17%</td>
</tr>
<tr>
<td>(+ 2.7% vs. 2017)</td>
<td>ITALY 374.220</td>
<td>MEXICO 10%</td>
</tr>
<tr>
<td>International: 53%</td>
<td>FRANCE 370.276</td>
<td>USA 5%</td>
</tr>
<tr>
<td>Domestic 47%</td>
<td>UK 367.448</td>
<td>FRANCE 5%</td>
</tr>
<tr>
<td></td>
<td>GERMANY 264.303</td>
<td>PORTUGAL 2%</td>
</tr>
</tbody>
</table>

OVERNIGHT STAYS: 21.45 M (+ 1.6% vs. 2017)

Average stay: 2.1 nights  Accommodation: 61% International 39% Domestic

€

EXPENDITURE (Madrid province)
Total expenditure: 9.322 M Euros (+5.3% vs. 2017)
Average daily expenditure: 243 Euros (+10.2% vs. 2017)

ACCOMODATION:

| HOTELS | 792 |
| HOTEL BEDS | 85 418 |
| NO. OF EMPLOYEES | 11 664 |
| OCCUPANCY RATE | 76.48% |
| ADR (average daily rate) | 95.06 Euro |
| RevPAR (revenue per room) | 73.42 Euro |

Source: Anuario de Turismo de Madrid 2019
million visitors (53.3% international, 46.7% national) that generated 21.4 million overnight stays.

7.1.4 Source market

Throughout 2018 the USA was the main source market with 681,300 visitors, comprising a 12.5% market share. Italy (6.9%) and France (6.8%) occupy the second and third positions respectively.

China was Madrid’s ninth largest international market in 2018 with 173,320 tourists and a 3.2% market share; it is becoming a key source market due to its 17% annual growth.

Table 7.2 Main reasons to travel to Madrid

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CULTURAL HERITAGE AND MUSEUMS</td>
<td>28</td>
</tr>
<tr>
<td>GASTRONOMY</td>
<td>17.08</td>
</tr>
<tr>
<td>LEISURE</td>
<td>15.95</td>
</tr>
<tr>
<td>PERFORMANCE ARTS</td>
<td>13.84</td>
</tr>
<tr>
<td>FAMILY / FRIEND VISITS</td>
<td>6.08</td>
</tr>
<tr>
<td>SHOPPING</td>
<td>5.95</td>
</tr>
<tr>
<td>CITY BREAK (WEEKEND)</td>
<td>4.34</td>
</tr>
<tr>
<td>VARIOUS / OTHER</td>
<td>3.60</td>
</tr>
<tr>
<td>EVENTS</td>
<td>2.39</td>
</tr>
<tr>
<td>MICE</td>
<td>1.41</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Source: Anuario de Turismo de Madrid 2019

7.2 Destination Management/Marketing Structure

“Madrid Destino” is the body responsible for the promoting and marketing of Madrid as a destination; it functions within the Municipality of Madrid’s City Council. It is the key entity that devises and implements strategic plans for tourism development and management at the city level. Madrid Destino coordinates activities and initiatives with other public and private stakeholders under the umbrella of the City Council. Its related departments include Travel Trade; the Madrid Convention Bureau; Tourism Advertising and Marketing; and lastly, Tourist Assistance and Information. All of these departments work to expand and diversify tourism products and experiences in alignment with different visitor profiles. They strive to improve the image, brand, and positioning of Madrid at a global level.

7.3 Perspectives for Smart Tourism

In recent years innovation has led Madrid to adopt smart initiatives such as better connectivity, mobility and sustainability to enhance the lives and productivity of its citizens. Tourism has benefitted from these initiatives and has introduced smart tools, digital platforms and new business models to improve the quality of visitors’ experiences, enabling Madrid to perform better in a competitive environment.

The results of a survey conducted by the WTC to assess the scope of these smart initiatives amongst its members indicates the following:

- “Madrid Destino” has established its Tourism Intelligence Center, an institution that collects and analyzes relevant data to be utilized for short and midterm management strategies. These tools also provide tourism stakeholders with strategic knowledge to assess and monitor customer behavior.
- “Madrid Destino” uses Big Data through e-commerce platforms, real-time data, social networks and electronic booking records, as well as open data.
- The City Council is launching plans for sustainable biodiversity management, and tourism establishments are performing quite well in terms of waste separation, sustainable freshwater management, and renewable energy consumption.
- The municipality has introduced soVF smart inter-urban transport facilities and public transport is accessible to people with specific access requirements.
- The city has developed mobile applications to enable visitors to improve their experience along the tourism value chain, for example Maas Madrid for public transport, and
FastPass for accommodations, check-in and checking-out.

- Other operational platforms and/or new technology tools are available in the tourism information systems, such as NFC for ticketing, VR devices e.g. Madrid 360 and Faro Explorer, SAGIT (Advanced System for Managing Tourist Information), and Navigable PDFs. Most of the tourism stakeholders are already engaged in these digital platforms.

- The City Council has also introduced several social and economic initiatives to enhance sustainable tourism development and management. Madrid 21 Destinations and Mira Madrid both promote decentralization of the tourism flows in the urban area; Hotel Feliz Awards and Madrid Acoge Awards encourage better labor relations, and AiMadrid4All is an initiative promoting accessible tourism; Infocart is an eco-friendly mobile unit for tourism information; NGO Equoevento promotes responsible use of resources, and Made in Madrid supports local entrepreneurship and innovation.

- In 2019, more AI systems and augmented reality applications will be put in place, and applications of Chatbots will be consolidated.

- Vuelve a Madrid, a digital customer loyalty program was launched in 2017 with the involvement of many local enterprises.

- A variety of new platform tourism services for information, accommodation, transport, food and catering are widely used, for example Booking.com, Bookingfax, Trip Advisor, HomeAway, com, Airbnb, The Fork, Expedia, Kayak, Civitas, etc.

7.4 VUELVE A MADRID (COME BACK TO MADRID): A Success Story as a Smart Initiative

7.4.1 Mission:
The goal is to transform the city of Madrid into a pioneer in innovative tourism, to make it: “A unique urban destination with its own loyalty club”.

7.4.2 Vision
“Vuelve a Madrid”, is an effective and smart marketing tool that aims to become a strategic vehicle for the competitiveness of the local tourism industry and the city of Madrid as an urban destination.

7.4.3 Objectives:
To increase Madrid’s returning visitors by building a loyal market:
- To increase tourists’ expenditures
- To diversify the tourism experience along with tourist consumption patterns
- To mitigate seasonality issues
- To decentralize tourism activities and attractions and promote less explored sites
- To strengthen public/private partnerships

7.4.4 Main Innovative Features:
The loyalty program “Vuelve a Madrid” was launched by the City Council of Madrid in 2017 as a user-friendly digital platform to provide benefits to the visitor/customer as well as to the engaged product/service suppliers in the city. The incentive program encourages tourists to revisit Madrid by offering a set of exclusive benefits from companies based on a “points accumulation system”. In principle, the users register on the...
platform www.vuelveamadrid.com and obtain Puntos Madrid. The users can exchange their vouchers for special offers from the enterprises by downloading them on their smart devices or by printing them out for future use in selected establishments.

The initiative, which has been successfully put into place by Madrid Destino, is the first case of a “loyalty program for a destination”. The program is proactive and centrally managed (registration, point allocation, vouchers for users, generation of alphanumeric codes, social media reports, etc.) and is free of charge for the time being for the partners/enterprises who offer their products and services via the platform.

Technically speaking, the website has AAA level of accessibility and has been developed to facilitate easy access for those who have disabilities.

The European Regional Development Fund (ERDF) co-financed the launch of this platform together with the Madrid City Council through the Madrid Destino Department. A total of 70 establishments/companies/institutions of different categories and scales have participated in the program by offering a wide variety of experiences such as Thyssen-Bornemisza National Museum, Tour Bernabeu, Anastasia the Musical, the Madrid International Jazz Festival, the Mercado de Anton Martin, Corral de la Moreria (tablao flamenco) Azotea del Circulo, Cool Tour Spain, Hammam Al Andalus, Hotel Miguel Angel by BlueBay, and many others. (See the list of program participants)

7.4.5 Beneficiary

- The city of Madrid will be the main beneficiary of these initiatives if these objectives are successfully accomplished.
- Ideally, customers benefitting from these free or low-cost services and innovative products will be encouraged visit Madrid again.

The local tourism sector, by participating in this innovative platform will gain further exposure and visibility to their customers, and reinforce their brand identity and positioning, improving their effectiveness by expanding their collaboration with third parties. These benefits do not imply any additional costs for the participating companies.

- The program provides visibility and updated information to the current/potential visitors and customers about the destination and its local tourism stakeholders through a variety of platforms and media such as: www.vuelveamadrid.com, promotional videos, www.esmadrid.com, social media, blogs, esMADRID magazine, newsletters, specialized broadcasting and media, www.madridturismosector.es.

7.4.6 Impact and Expected Outcome:
(Source: Madrid Destino, May 2019)

<table>
<thead>
<tr>
<th>Table 7.3</th>
<th>Current Program Indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>311 568 visits to the website</td>
<td></td>
</tr>
<tr>
<td>34 400 vouchers offered through the platform</td>
<td></td>
</tr>
<tr>
<td>5 500 registered users</td>
<td></td>
</tr>
<tr>
<td>2 000 vouchers (downloaded)</td>
<td></td>
</tr>
<tr>
<td>70 partner companies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7.4</th>
<th>Performance Indicators (expected by December 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 000 visits to the website</td>
<td></td>
</tr>
<tr>
<td>50 000 vouchers offered through the platform</td>
<td></td>
</tr>
<tr>
<td>15 000 registered users</td>
<td></td>
</tr>
<tr>
<td>4 000 vouchers (downloaded)</td>
<td></td>
</tr>
<tr>
<td>100 partner companies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7.5</th>
<th>Promotion Achievements</th>
</tr>
</thead>
</table>

come back to Madrid(Vuelve a Madrid)
7.5 Observations:

The city of Madrid is one of the top urban destinations worldwide (leisure and MICE) and has been performing successfully in recent years through strong and effective tourism development and management strategies, which are also compatible with the overall urban development policies.

As has been indicated previously, the city of Madrid has embraced innovative mechanisms and models for sustainable tourism management and market intelligence, and in the meantime adopted and/or launched smart tourism tools which enable the customers to enhance the quality of their experience while enabling the industry to maximize its benefits in terms of brand and positioning. The strategic public and private partnerships, particularly those for the marketing of Madrid as an urban destination at national and international levels have gained momentum through the implementation of digital technology and smart initiatives. In Madrid, relevant practices of smart tourism are becoming a driving force for innovation, creativity and competitiveness.

“Vuelve a Madrid” is a promising example of a “co-creation experience” which allows customers to become an active and fundamental part of the tourism value chain.

The companies interviewed (Cool Tour Spain www.cooltourspain.com, Hammam Al Andalus Madrid www.hammanandalalus.com, and Hotel Miguel Angel by BlueBay www.hotelmiguelangel.com) have all agreed that this initiative adds value to their businesses and improves their access to their customers.

7.5.1 Opportunities:

- Under the umbrella of the local public authorities a “stakeholder synergy” is created among the engaged stakeholders for an effective marketing of Madrid.

- The enterprises which have participated in the program enjoy additional exposure to the public incurring no financial burden; this especially enables small enterprises to improve their competitive advantages.

- The platform offers a dynamic interface with visitors facilitating communication of market intelligence and the monitoring of customer behavior.

- The initiative provides recognition and visibility to the less-explored parts of the city and related experiences.

- Vuelve a Madrid, an innovative initiative operated and monitored by local authorities, has great potential to involve more partners and achieve its objectives by creating added value to the management and marketing efforts of Madrid as a destination.

7.5.2 Challenges:

- As regards the overall objective and impact of the program: “to increase the number of returning visitors to Madrid by building a loyal market”; the expected quantitative results cannot be achieved and measured in the short term, and the initiatives need further promotion among the target segments of the market and the industry.
8.1 Introduction

Often dubbed the “red city” or “ocher city”, Marrakech is the capital prefecture of Marrakech-Safi, one of the twelve regions instituted by the Kingdom of Morocco in 2015, each region corresponding to a Wilaya. The region is located at the bottom of the Atlas Mountains and covers an area of 2,625 km², with 70% flat lands and 30% hills.

Based on the latest general census carried out in Morocco in 2014, the population of Marrakech prefecture totalled 1,330,468 inhabitants in 2014, with an urbanization rate of 73.70% (Marrakech-Safi region: 4,504,767 and Morocco: 33,848,242).

Considered the capital of tourism of Morocco and its fourth largest city, Marrakech covers a surface area of 31,160 km², which represents 4.5% of the national territory. Together with tourism, its economy is mainly based on commerce and crafts.

Marrakech city is subdivided into two distinct parts: the new (or modern) part including the districts of Guéliz and Hivernage, and the historic part of Medina.

8.1.1 Marrakech Action Plan for 2017-2022

The Marrakech Action plan for 2017-2022 was prepared by the City of Marrakech through a participatory process involving 1,200 participants, including 200 women, 70 external participants and 60 representatives from the private sector.

This Marrakech Action Plan focuses on three priorities:

1. Economic development and valorisation of tangible and intangible heritage;
2. Sustainable development of the urban fabric, and universal access to basic services;
3. Local governance and upgrading of the communal administration, cooperation and partnerships.

Three orientations have been set, leading to the identification of 297 projects (total budget of MAD 12.4 billion, or EUR 1.14 billion) to develop Marrakech as:

- An authentic city and a global tourist destination;
- A city of sustainable renewal, offering decent conditions for its inhabitants and its visitors;
- An open city adopting the mechanisms of good governance for territorial development.

8.1.2 Marrakech Tourism

The national tourism strategy of Morocco “Vision 2020” was designed in 2010 with the main objective to distribute and disseminate the revenues generated through tourism within the country. This strategy has set several goals aimed at leveraging the natural and cultural assets of eight competitive tourism territories, including “Atlantic Marrakech”, which encompasses Marrakech, Toubkal and Essaouira, while taking into account their carrying capacity.

8.1.2.1 Connectivity

Between 2015 and 2018, there were 73 new flight connections with the airport of Marrakech-Menara, which now receives 254 flights a week. The number of passengers registered at the airport has increased from 3,978,725 in 2015 to 5,350,000 in 2018.

The growth in air traffic is expected to continue in 2019 and 2020, according to the Conseil Régional de Tourisme (CRT) de Marrakech, the Regional Council for Tourism of Marrakech.

8.1.2.2 Tourist attractiveness

Since its foundation in 1062 by the first King of the Almoravides dynasty, Marrakech has evolved to become a popular tourist destination due to its many historical, cultural, architectural, and natural assets.

The Medina of Marrakech was designated a UNESCO World Heritage Site in 1985, and in 2001, the Jemaa El Fna square was listed as a UNESCO Masterpiece of the Oral and Intangible Heritage of Humanity.

On 7-18 November 2016, Marrakech hosted the twenty-second Conference of the Parties (COP22), and the City designed, implemented and committed to many
sustainability initiatives on that occasion.

During the Africities Summit in November 2018, the city of Marrakech was designated African Capital of Culture 2020.

8.1.2.3 Tourism flows

In 2018, the Kingdom of Morocco recorded 12.3 million international arrivals, an increase of 8% compared to 2017.

At its Ordinary General Assembly in May 2019, the CRT of Marrakech announced that the city had registered 2,592,224 tourist arrivals (+6% from 2017) including 300,000 Business / MICE travelers, corresponding to 8,514,431 overnight stays (+10% from 2017). The occupancy rate rose to 59%.

By nationality, tourists from France totalled the highest number of overnight stays in 2018 (2,339,222/+10%), followed by Great-Britain (1,077,686/+3%), Germany (474,232/+12%) and Spain (323,694 overnight stays/+52%).

In June 2016, Morocco exempted Chinese nationals from visa requirements. The number of Chinese tourist travelling to Morocco increased from 15,000 in 2015 to 180,000 in 2018. Earlier this year, the Director of the Office National Marocain du Tourisme (ONMT), the Moroccan National Tourism Office, announced that a direct flight from China to Morocco was under consideration.

8.1.2.4 Tourism Accommodation

Etablissements Hoteliers Classés (EHTC), or classified hotel establishments, have rapidly expanded in Marrakech in recent years, mostly towards luxury tourism. By the end of 2018, there were 85,000 beds in EHTC, 40% of them being in four and five-star hotels. Five-star hotels recorded 2,809,957 overnight stays in 2018, followed by four-star hotels (2,385,737) and hotel clubs (1,759,215 overnight stays).

8.1.2.5 Destination management

The main mission of the CRT is to promote the development of tourism in the Marrakech- Safi Region in coordination with the Ministry of Tourism and ONMT, for the implementation of the visions and strategic programs at the regional level.

8.2 Sustainable Tourism in Marrakech

On 20 June 2019, a participatory meeting was held between the CRT, local administrators and tourism operators of the Marrakech-Safi region, and led to several recommendations, including the establishment of a regional observatory for sustainable tourism competitiveness, and the decision to support tourism operators’ goal of successful digital transition.

8.2.1 National strategy of Morocco for sustainable tourism

Since 2006, Morocco has demonstrated its commitment to promoting sustainable tourism, through a variety of initiatives and projects such as the “Trophées Maroc du tourisme durable” (Morocco Sustainable Tourism Awards), and the Moroccan Charter for Sustainable Tourism updated in January 2016 on the occasion of the first edition of the Moroccan Sustainable and Responsible Tourism Day.

In 2014, the Moroccan Ministry of Tourism was elected as co-lead of the “One Planet - Sustainable Tourism Programme”, one of the six programmes launched under the umbrella of the 10-Year Framework of Programmes on Sustainable Consumption and Production, led by the World Tourism Organization (UNWTO). The One Planet Network highlighted several case studies for Morocco such as the Sustainable Lifestyles Cased Studies from the Hospitality Workplaces-Marrakech Hotels.

8.2.2 Sustainable tourism in Marrakech

The CRT of Marrakech has worked with institutional partners such as the Wilaya, the City council, the Office national des Aéroports (ONDA), the National Office of Airports, and the Agence Urbaine (Urban Agency) to design and implement a sustainable tourism strategy in Marrakech.

Screenshot of Green Key Portal
Due to hotels, swimming pools and golf courses, Marrakech has suffered from a growing depletion of its water resources, and 30% of its palm groves had been impacted as of 2016, year of the COP22. Since then, a vast tree-planting program has been carried out, along with other measures.

8.2.2.1 Introduction and Implementation of the Green Key Label

Together with the Blue Flag eco-labelling scheme for beaches, the Green Key label has been promoted in Morocco by the Foundation Mohammed VI for the Protection of the Environment chaired by HRH Princess Lalla Hasnaa since 2008.

As of 2018, there were 84 Green-Key-labelled accommodation establishments in Morocco (5.6% of a total of 1,500 establishments, including 600 guest houses), 28 of them being in Marrakech.

Through its Green Key Portal, the Foundation Mohammed VI for the Protection of the Environment has promoted the Green Key label and shared tools and good practices implemented by labelled hotels, such as composting and waste water management.

8.2.2.2 Preservation of cultural and natural heritage

At the central government level, a partnership agreement was signed in 2018 for the financing and execution of the rehabilitation program of the Medina. This 45-month project includes several components such as development of the main arteries and green spaces, and the renovation of some monuments and historic gardens.

Additionally, a series of conventions were signed in May 2019 in order to preserve the authentic architectural and urban characteristics of the old medina of Marrakech and to enhance its local architectural aspects.

8.2.2.3 Decent work and economic growth

Located on the outskirts of the city, the former industrial district of Sidi Ghanem in Marrakech was hit by the textile crisis from the 1980s. It was then developed by the Erac-Tensift (regional establishment of planning and construction) and is now a business area of 175 hectares with more than 500 industrial lots, full of local designer workshops and trendy stores selling their productions, including high-end fashion items that are sold to locals and tourists.

Located in Sidi Ghanem, Emerging Business Factory was established in December 2015 as the first private incubator / co-working space of Marrakech, hosting and supporting several start-ups involved in the local and global tourism and hospitality industries.

8.2.2.4 Environmental sustainability

The 2011 Constitution of the Kingdom of Morocco enshrines sustainable development as a right for all citizens, with various policies, institutional reforms, and national strategies, as well as structuring programs aimed at promoting renewable energies, energy efficiency, water saving and the sustainable management of solid and liquid waste.

As a key economic sector for Marrakech and a heavy consumer of environmental and energy resources, tourism occupies a central position in this framework.

Extension of the capacity of the Marrakech Waste Water Treatment Plant

In order to follow along with the urban and tourism development of the city of Marrakech, the Régie Autonome de Distribution d’Eau et d’Electricité de Marrakech (RADEEMA), the public company in charge of water and power supply services in Marrakech, has implemented a vast extension of the capacity of the waste water treatment plant (STEP).

Since then, STEP has contributed to sustainable tourism since waste water has been heavily used for watering green areas and Marrakech’s 14 golf courses in order to put less pressure on the region’s water resources. In 2016, the average annual water consumption of a golf course in Morocco was estimated to be 200,000 cubic meters.¹²
Biogas valorization of the Marrakech landfill site

This project will generate one megawatt of power to support the public lighting network of Marrakech managed by RADEEMA, thanks to the methane collected from the landfill, which will be treated and converted in a bioelectric site, hence contributing to the reduction of around 60,000 tons of CO\(_2\) per year.

8.2.2.5 Green transportation

The Municipality of Marrakech has opted for electric buses operated within the framework of the High-Level-Service Buses or Bus à Haut Niveau de Service (BHNS) Project. Furthermore, a photovoltaic solar station has been installed with a total capacity of one megawatt for charging electric buses.

The first fleet of over 30 buses is in operation in reserved corridors, together with tram-buses on wheels using any kind of corridors.

8.3 Smart Solutions for Sustainable Marrakech

8.3.1 National digital and smart strategies

In 2016, the Ministry of Urban Planning and Development (MUAT) initiated a strategic vision supported by master plans for the digital transformation of Moroccan cities, with Marrakech, Fez and Agadir selected as pilot cities.

Marrakech will also benefit from the adoption in February 2019 of the Consolidated law 24-96 on Post and Telecommunications, which addresses three fundamental conditions for the development of very high-speed broadband and FTTH-Fiber To The Home-network in Morocco: digital urban planning, extension of universal high and very-high broadband connectivity services, and framework for the establishment of telecom infrastructures for new buildings.

In 2016, Morocco ranked 42nd out of 178 countries in Open Data and first in the North Africa region\(^\text{13}\).
The main platforms used for open data are Data.gov.ma\(^4\) and Morocco Data Portal\(^5\).

### 8.3.1.2 Smart utilities

RADEEMA has implemented the digital transformation of its customer management through a comprehensive set of services and tools, which benefit tourist operators in Marrakech.

In particular, RADEEMA has launched its new "e-invest" platform in 2017, in order to process and manage the administrative and commercial procedures online, equipping real-estate investors, promoters, hotels, and medium voltage customers.

**Other initiatives of RADEEMA include:**

- Development of mobile solutions such as the Smartphone App RADEEMA Mob, an electronic solution aimed at improving customer management and Customer relationship management;
- RADEEMA-SMS service;
- Mobile App for Cash Collection;
- Mobile App for Meter Reading, with the progressive generalization of remote power meter reading starting with large customers.

**Public lightning optimisation Project**

In parallel with the use of solar energy, Marrakech advocates energy efficiency, with the use of light-emitting diodes, LEDs, for its public lighting system.

Maintenance is facilitated through a computer system (CMMS-computerized maintenance management system) with a monitoring system for tracking and control.

In order to optimize its public lighting management, and within the COP22 organization framework, the Municipality of Marrakech took the opportunity to renovate its public lighting park representing about 61.000 light points.

Moreover, four “trees” holding smart solar panels have been installed in Marrakech for the COP22, providing light during night time, and free energy to charge phones. Since then, these solar-trees have been relocated in tourist areas such as the Jemaa el-Fna square.

### 8.3.2 Smart Tourism Vision of Marrakech

In 2015, the CRT of Marrakech initiated a digital strategy in consultation with ONMT.

The website Visit Marrakech\(^6\) was launched in 2016 as the first official tourism portal of Marrakech. According to the CRT, it had recorded a monthly traffic of 50,000 visitors by the end of 2017. It is now available in Arabic, Chinese, English, French, German Russian, and Spanish.

Moreover, the App MyCop22 was launched as the official application of COP22 in Marrakech in 2016, and is available in four different languages (English, Spanish, French and Arabic).
MyCopp22 offered the following features to the COP22 delegates:

- schedule of events,
- shuttle schedule to the Bab Ighli site,
- landmarks of Marrakech,
- on and offline route planner.

The CRT also relies on a Facebook Page Visit Marrakech: 11,542 followers as of June 30, 2019 (Instagram 2,030; and Twitter 256).

The CRT is currently developing a “Marrakech Pass” based on the London Pass model. The Pass would be available for purchase online (available languages: English, French, Spanish, Russian and Chinese), through a QR code, or through retailers at different prices (120€, 80€, or 60 €).

The Pass would provide access to monuments, gardens, events, etc. at discounted prices, and would be personalized according to the personal interests of visitors: golf, dining, attractions, event, shopping, events, etc.

The 2019 action plan of ONMT provides for the implementation of structural actions, including an important digital turning point. In this context, the Office has planned to turn to several platforms and mobile applications like WeChat, the most widely-used social network in China.

Moreover, The Chinese electronic Wallet Alipay is planned to be deployed in Morocco beginning in 2019 by the Centre Monétérique Interbancaire (CMI) in partnership with AfricaPass, EuroPass and SwiftPass.

Since 2017, Naps, a subsidiary of M2M in Morocco, is also active in the electronic banking market and has developed partnerships with oil company Petrom to install Electronic Payment Terminals-EPT in gas stations as well as in retail and transportation businesses. In December Naps announced their plan to include Alipay and WeChat payments in the near future.

8.4 Marrakech, a City of Permanent Renewal

Since its origin and throughout its history beginning in the 11th century, Marrakech has learned to intelligently adapt to its environment by creating favorable conditions for sustainable development.

As developed by the CRT, the concept of “Smart Destinations” includes:

- Tourism planning;
- Integrating sustainability into the tourism
value chain;

- Technology, including customer experience and service delivery;
- Effective and efficient resource management based on existing capabilities.

Local stakeholders have carried out several actions as part of the project “Marrakech, City of Permanent Renewal” in order to ensure the sustainable and smart development of Marrakech and to allow residents and tourists to enjoy all the facilities and services without threatening the City’s wonderful heritage.

Some of these projects have been completed while others are in progress, including:

- Creation of museums dedicated to the promotion of heritages such as:
  - Museum Yves Saint-Laurent of Marrakech (October 2017),
  - Mohammed VI Museum for the Civilization of Water (May 2017), founded by the Ministry of Habous and Islamic Affairs,
  - Dar El Bacha Confluences Museum (December 2017);
- The renovation of built heritages: medina, landmarks, ramparts, neighborhoods, and public areas
- The digitalization of public areas: Marrakech is a city with many green spaces and gardens that has been transformed into Cyber parks and smart gardens with free Wifi to allow people to use their digital devices on the spot.

8.4.1 Transportation and mobility

8.4.1.1 “Medina Bike” Project in Marrakech

Marrakech has set up a self-service bicycle project as part of a large greening initiative in the city to promote low-carbon mobility, in partnership with the Moroccan State Secretariat for Sustainable Development, the United Nations Industrial Development Organization (UNIDO), the Urban Commune of Marrakech, the Medina Bike Company, the Wilaya region of Marrakech Safi.

8.4.1.2 Taxi Roby

Launched in December 2018 in Marrakech and in February 2019 in Casablanca, the Taxi Roby App, dedicated only to small and large taxis, has already more than 1,200 drivers in both cities and some 10,000 active customer accounts.

Roby’s model involves no commission on the trip by the taxi driver, but a monthly fee of MAD 490 for the use of the booking platform, and the respect of strict requirements in terms of hygiene and safety.

8.4.1.3 Smart Innovation Process

In November 2017, an international Hackathon was organised in Marrakech.
Around 100 young engineers, designers, entrepreneurs, start-ups and citizens, worked to propose projects and find concrete solutions to several challenges related to the reduction of CO₂ emissions; from green two-wheelers to the optimization of urban infrastructure to serve green two-wheelers, as well as improving the safety and security of motorcyclists.

### 8.4.2 Accommodations

More and more accommodation establishments in Marrakech are voluntarily integrating and implementing smart solutions to reduce their energy consumption and carbon footprint, especially when it comes to air conditioning.

At the Conference on Energy Efficiency for Hospitality hosted in Marrakech, on 19 June 2019, the pilot project of District Cooling in the Hivernage district was discussed.

Regarding the so-called sharing economy, almost 17,000 Moroccans had rented an apartment, a villa or a room through Airbnb platform as of 2016, providing a place to stay to 210,000 tourists in Morocco, coming from 140 countries.

The KriDari platform was launched in May 2018, as the first platform for searching and booking vacation houses. It is currently available in French, Arabic, English and Dutch.

Through the input of the Moroccan central government and local stakeholders from the public and private sectors in Marrakech, the ochre city has progressively developed itself as a smart sustainable tourism destination, strengthening its solid socio-cultural, historical and natural assets to seize the opportunities and complexities of a growing global tourism market.

### Chapter 8 Endnotes

1. A “wilaya” is a decentralized district existing in parallel with a region (local authority). It is chaired by a wali, appointed by the King of Morocco.
2. RGPH, Recensement Général de la Population et de l’Habitat, General Census of Population and Housing, 2014
6. Moroccan expert studies
7. https://www.blueflag.global/
8. Initiated in 2002 by the ONG Foundation for Education and Environment (https://www.fee.global), Green Key is a voluntary eco-label that has been awarded to about 2,700 hotels and other establishments in 56 countries.
Special Report
1. MIT Senseable City Lab

1.1 Vision

The Massachusetts Institute of Technology’s Senseable City Lab is a cutting-edge multidisciplinary research group that studies the interface between cities, people, and technologies and investigates how the ubiquity of digital devices and the various telecommunication networks that augment our cities are impacting urban living.

Considering that the Digital Revolution is changing the way we live today as radically as the Industrial Revolution almost two centuries ago, the Lab’s researchers envision and study solutions that may be out of the reach of today’s technology, but work towards developing the scientific grounding for their realization.

1.2 Expertise

- Mobility & Infrastructure (Reimagining the future of urban systems)
- Environmental & Health (Monitoring urban environment for a healthier future)
- Data Analytics & Visualization (Turning big data into urban stories and actionable tools)

1.3 Senseable by Numbers

- 400 collaborators from different disciplines
- 500 scientific papers and conference presentations
- 100 real-world projects
- 31,000 citations

2. Showcase: Louvre people-tracking Project (In Brief)


2.1 Introduction and Background

There’s no doubt that one of the great tourist attractions are museums. But how do people move in a museum? How to improve their experience by redesigning internal spaces? In this project started in 2012 but re-started in 2017, the lab uses different technologies for tracking people at Louvre’s museum in Paris and understand their visiting paths.

In this study the lab discusses the exploitation of data originated from Bluetooth-enabled devices to understand visitor’s behaviour in the Louvre museum in Paris, France.
The collected samples are analyzed to examine frequent patterns in visitor’s behaviours, their trajectory, length of stay and some relationships, offering new details on behaviour than previously available. Our work reinforces the emergence of a new methodology to study visitors. It is part of recent lines of investigation that exploit the presence of pervasive data networks to complement more traditional methods in tourism studies, such as surveys based on observation or interviews.

2.2 Strategies to collect empirical visitor data

The lab first explored the ways used by previous studies to capture and collect visitors’ data in the context of tourism. However, the researchers found all ways have strengths and prominent weaknesses, such as: the limited time for survey, limited participants or limited space areas. All these limitations unavoidably influence the results.

2.3 Data Collection Settings

Considering the popular use of mobile phones and the situation that almost-all devices are equipped with Bluetooth (with passive mode turned on), the lab explored to detect the wireless spectrum by sensors in this study.

2.3.1 Study Objective

As the most visited museum in the world, the Louvre Museum has strong incentive to explore, to analyze and to improve the visitors’ experience. Facing the increasing visits, the Louvre hopes to provide better services, to design scientific management strategies and to reduce pressures on staffs through implementing the study.

In order to achieve the goal, the lab proposed to collect and analyze the empirical data on the flows and occupancy levels of visitors in key areas of the museum.

2.3.2 Study settings and characteristics of the Bluetooth sensors

To achieve the goal, Le Louvre officials suggested to locate the study at one of the most popular areas—a trajectory that leads visitors from the entrance (Pyramid) to the Venus de Milo.

10 Bluetooth sensors were deployed to collect data of visiting sequences and staying times along the path.

2.4 Collected Data and Measures

The study period was defined as a 10-day period in May 2010. The raw dataset collected from sensors required to pre-processing in order to extract valuable information. Basically, the data consist of one unique ID and two timestamps (check-in and check-out).

The study collected 12,944 samples. The researchers did the data cleaning process to remove logs of staff or irrelevant persons (e.g. outside the visiting period).

2.5 Results and Findings based on the study

The study is designed to discover the following two things:

- The spatial use in the museum
- Visitors’ trajectories

in order to extract the frequent patterns of visitors’ behaviour and manage the crowd.

2.5.1 Representativeness of the Collected Sample

First, the representativeness of the collected sample has been tested. The lab compared the data with the official counts of sales of 101 days by using the linear regression model. The correlation is +80% strong positive (between 5.9% and 8.7%), providing supports for the representativeness.

2.5.2 The Spatial Use

For testing the spatial use, we choose the Pyramid Space to analyze. The Pyramid space serves as the connection node to 3 museum accesses, named Denon, Sully and Richelieu. And the use of Pyramid will help the museum to make efficient and flexible policies.

Therefore, mobile devices detected by
2.5.3 Visitor’s Trajectories

In order to unveil the frequent patterns of visitors’ behavior, the study analyzed the trajectories, stay length and their relationship.

The study explored the most used trajectory, transition rates and the relation between length of stay and number of visited nodes.

The study found that there was NOT a prominent difference between the short stay (less than 1:30 min) and long stay (more than 6 hours) visitors. All of them will visit the similar locations (path sequence length and its order), but the long stay visitors tend to do so extensively. Even though the museum provided more exhibitions, visitors wouldn’t visit them all and tended to be more selectively.

More information please refer to: http://senseable.mit.edu/louvre/

3. Brief Introduction of Other Projects related to Tourism and Cities

3.1 Urban Lens

How data can help us better understand our cities and the people that leave in them? Doing so, it is possible to compare different cities (or regions), compare different spending behaviors and ideally diversify inhabitant spending patterns from tourists ones. The following project is the first attempt in doing so, using millions of financial transactions in Spain.

Since the advent of pervasive digital technologies in our daily lives, people are leaving an increasing amount of digital traces. Creating data analytics and data visualization from this new layer of information sheds light on the rich insight of human behavior from the micro scale of individuals and households, that can scale up to a macro scale characterization of cities and countries.

Researchers at the Senseable City Lab built a novel multi-scale predictive model of Spanish regions, quantifying the distinctive signature of each region based on their spending behavior by identifying indicators regarding the amount of spending, type of spending, type of individual, and individual mobility. The model was validated at the provincial scale using official performance statistics, and proved a strong correlation between individual spending behavior and official socioeconomic indices. Finally, a scale-free clustering was developed to enable a consistent aggregation of regions in different spatial dimensions. Urban Lens holds tremendous potential in its far-reaching applicability to discover patterns that can be used in urban planning, policymaking and business decisions. The web
application allows users to explore these indicators and cluster regions based on their distinctive economic signature.

More information please refer to: http://senseable.mit.edu/urban-lens/

### 3.2 Friendly Cities

It is also possible to better understand how people interact in cities, and if this interaction happens only within certain categories of people (yielding to social segregation) or mixing different categories of people (facilitating social inclusion). The following study aims at recognizing physical places in the city that foster segregation vs. inclusion, using mobile phone location data. This is particularly relevant for the tourist sector, as the mixing of tourist/locals is a key measure both for tourism sustainability and for a tourist authentic experience in a city and their direct learning from locals.

Technological advancements in the contemporary world have empowered people—especially in urban settings—to interact through a variety of social channels (e.g., phone calls, emails, and social network tools). Despite of this digital transformation, the roles of physical space in facilitating human social interactions have never become irrelevant. An improved understanding of how people are connected in physical space serves as valuable information to urban designers, local service providers, and communities at large.

As vast human mobility datasets become readily available, it is important to ask questions about how effectively urban space and places bring together people, the nature of those places, as well as what kinds of patterns arise in cities. With this new research conducted at MIT Senseable City Lab, the social roles of a city can now be better evaluated at unprecedented spatiotemporal scales, inspiring new policies and practices that benefit the well-being of people and society.

More information please refer to: http://senseable.mit.edu/friendly-cities/

### 3.3 Indistinct Cities

On a more general perspective, we might ask why some cities are so unique and worth it to visit. This is of course a too-vague question, but restricting it to visual similarities only (e.g. architecture, city topology, greenery, infrastructure shapes…) we might ask which cities are more “similar” to each other, and try to quantify that measure. In the following project, an AI-based algorithm has been deployed to provide that answer, using millions of Google Street View images.

Using more than 2 million social media images, a model that quantifies the distinctiveness of 18 cities around the world has been developed, and identifies their visual similarities. While each city has its own visual identity, they often share visual similarities with one another. The lab quantified the similarity between two given cities as the summed percentage of images that the model misclassified as the other city.

More information please refer to: http://senseable.mit.edu/indistinct_cities/

### 3.4 Roboat

Lastly, a project that grounds on the fundamental technology revolution of autonomous driving, but gives to it a very clear and defined scope: autonomous boats both for people and for cities services. The lab explored how self driving boat have the potential to innovate many city processes, and some of them could be designed specifically for tourism needs (e.g. transportation, attractions, accommodation, food…). Think about your self-driving floating hotel room!

Roboat is a 5 year research project and collaboration between the Amsterdam Institute for Advanced Metropolitan Solutions and the Massachusetts Institute of Technology. In developing the world’s first fleet of autonomous floating vessels for the city of Amsterdam, it investigates the potential of self-driving technology to change our cities and their waterways.

Roboat is a new kind of on-demand infrastructure: autonomous platforms will combine together to form floating bridges and stages, collect waste, deliver goods, and transport people, all while collecting data about the city. We re-imagine urban infrastructures with cutting-edge technologies.

More information please refer to: http://roboat.org/

Text excerpts and figures are curtesy of the MIT Senseable City Lab.
Reference


