Smart tourism: A case study of Da Nang city

Du lịch thông minh: Trường hợp nghiên cứu tại thành phố Đà Nẵng

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Abstract

The last few decades have witnessed the spread of technology in many sectors, which brought the cutting-edge solutions of a smart city in general as well as smart tourism in particular. A smart city is to give out productive solutions for government, enterprises, people, transport, tourism, etc., with the background of digital transformation. Consequently, smart tourism has become more popular over the past few years as a pillar of the smart city concept, aiming to provide guests with solutions that satisfy guest needs. Da Nang city is an emerging tourism destination in Asia that has implemented smart city and smart tourism platforms to facilitate its tourism.

The objective of this study is to determine the best approaches related to Da Nang's smart city and smart tourism. By using qualitative research methods of comparing and contrasting some experiences from various smart-tourism models of China and Korea, this study may be able to help Da Nang city improve its image significantly and foster guests' experiences as well.

Keywords: Destination image; smart city; smart tourism.

Tóm tắt

Trong vài thập kỷ gần đây, công nghệ đã lan rộng trong nhiều lĩnh vực, điều đó mang lại sự tiên tiến cho các giải pháp thành phố thông minh nói chung cũng như du lịch thông minh nói riêng. Thành phố thông minh là đưa ra các giải pháp hiệu quả cho chính phủ, doanh nghiệp, người dân, giao thông, du lịch, v.v... dựa trên sự chuyển đổi số. Do đó, du lịch thông minh đã trở nên phổ biến hơn trong vài năm qua, như một trụ cột của khái niệm thành phố thông minh, nhằm cung cấp cho du khách các giải pháp thỏa mãn nhu cầu của mình. Thành phố Đà Nẵng là một điểm đến du lịch mới nổi ở châu Á. Thành phố đã triển khai thành phố thông minh và các nền tảng du lịch thông minh để tạo điều kiện phát triển du lịch.

Mục tiêu của nghiên cứu này là xác định các cách tiếp cận tốt nhất liên quan đến thành phố thông minh và du lịch thông minh của Đà Nẵng. Bằng cách sử dụng phương pháp nghiên cứu định tính so sánh và đối chiếu một số kinh nghiệm từ các mô hình du lịch thông minh khác nhau của Trung Quốc và Hàn Quốc. Nghiên cứu này có thể giúp thành phố Đà Nẵng cải thiện đáng kể hình ảnh của mình và đồng thời thúc đẩy trải nghiệm của du khách.

Từ khóa: Hình ảnh điểm đến; thành phố thông minh; du lịch thông minh.

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1. Introduction

Currently, Da Nang determines that tourism is a key industry for the development of the city. Therefore, the city is always looking for suitable new directions and creating a driving force for Da Nang's tourism industry. In the digital age, the technology to be applied in tourism is an inevitable and Da Nang city is doing very well. However, in recent years a new term "smart tourism" has emerged. This leads to a change in tourism and its development Da Nang city. Da Nang has quickly caught up and changed to become one of the first city in Vietnam to move towards "smart tourism". Learning from models around the world, Da Nang city has been using digital technology to develop smart tourism for many years. The city is determined to transform significantly not only to develop tourism but also to develop in a sustainable direction. The digital transformation to build smart cities and smart tourism is gradually improving step by step.

The Da Nang tourism industry is always ready to innovate, adopt and enhance the application of information technology. According to the authors, this is a suitable direction to help businesses and cities develop. Therefore, the purpose of the paper is to provide two focus (1) pointing out the technologies of "smart tourism" or "smart city" that Da Nang Nang city is applying, (2) clarifying the challenges proposed by new models of some leading countries in smart tourism.

2. Literature review

2.1. Smart cities, smart tourism and their characteristics

a. Smart tourism

Lopez de Avila (2015, n.p.) defines the smart tourism destination as an innovative tourist destination, built on a foundation of state-of-the-art technology guaranteeing the sustainable development of tourist areas, available to everyone, which helps the a visitor's interaction with and integration into his or her surroundings, increase the quality of the practice at the destination, and improves residents' quality of life. Gretzel et al. (2015) define smart tourism as "tourism supported by combined efforts at a destination to collect and aggregate/harness data derived from the physical base, social connections, government/organizational sources and human bodies/minds in combination with the use of advanced technologies to transform that data into on-site experiences and business value-propositions with a clear focus on productivity, sustainability and experience improvement."
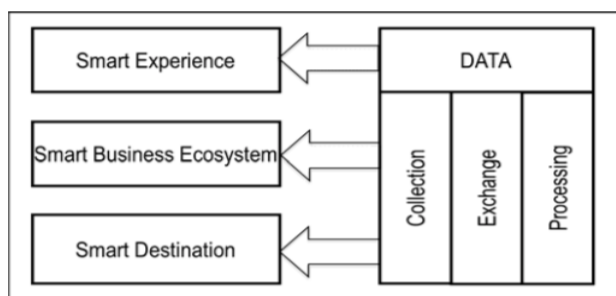
(Source: Gretzel U, Sigala M, Xiang Z, Koo C-2015)

Figure 1. Components and layers of smart tourism

According to Gretzel et al. (2015), smart tourism was defined as components and layer as Figure 1. Components and layers of "smart" include (1) Smart Destinations which were special cases of smart cities combination of ICT's into physical infrastructure, (2) Smart experience which specifically focuses on technology-mediated tourism practice and its engagement through personalization, context-awareness, and real-time monitoring, (3) Smart business refers to the complex business ecosystem that creates and supports the exchange of touristic resources and the co-creation of the tourism experience.

b. Smart destination

Smart destinations are special cases of smart cities: they apply smart city principles to urban or rural areas and not only consider residents but also tourists in their efforts to support mobility, resource availability and allocation, sustainability, and quality of life/visits.

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c. Smart business ecosystem

The term refers to the complex business ecosystem that creates and supports the exchange of touristic resources and the co-creation of the tourism experience. Buhalis and Amaranggana (2014) describe the business component of smart tourism as being characterized by dynamically interconnected stakeholders, the digitalization of core business processes, and organizational agility. A distinct aspect of this smart business component is that it includes public-private collaboration to an extent that is unusual and results from governments becoming more open and technology-focused as providers of infrastructure and data. In addition, smart tourism recognizes that consumers can also create and offer value as well as monitor and therefore take on business or governance roles.Tourism operators, airline or local bus transport operators, hotel or local homestay accommodation operators, excursion and activity operators, shopping department or mall operators, entertainment operators, etc., as Figure 2.
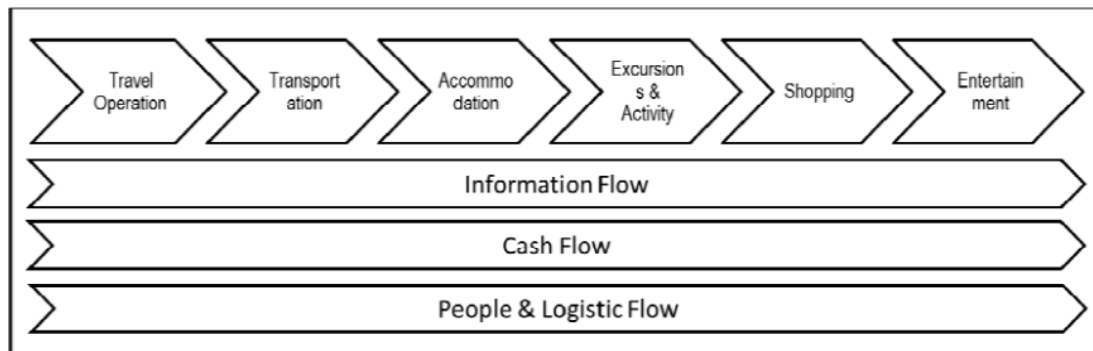
(Source: Hsu, C. C. (2018). Artificial intelligence in smart tourism: A Tsaih & Hsu conceptual framework)

Figure 2. Smart Tourism Business Ecosystem Value Chain

The smart experience component specifically focuses on technology-mediated tourism experiences and their enhancement through personalization, context-awareness and real-time monitoring (Buhalis and Amaranggana 2015). Neuhofer et al. (2015) identify information aggregation, ubiquitous connectedness and real-time synchronization as the major drivers of such smart tourism experiences.

With the focus on travelers as users of these systems, these systems aim to support travelers by: (1) anticipating user needs based upon a variety of factors, and making recommendations with respect to the choice of context-specific consumption activities such as points of interest, dining and recreation; (2) enhancing travelers' on-site experiences by offering rich information, location-based and

customized, interactive services; and (3) enabling travelers to share their travel experiences so that they help other travelers in their decision making process, revive and reinforce their travel experiences as well as construct their self-image and status on social networks. From the industry perspective, the emphasis is on the potential contributions of these smart systems in terms of process automation, efficiency gains, new product development, demand forecasting, crisis management, and value co-creation (Werthner 2003; Wöber 2003; Sigala 2012a and b; Yoo et al. 2015).

2.2. Experience from China and Korea in building smart tourism

a. China

According to the World Economic Forum (WEF) in 2019, the competitiveness of the Chinese tourism industry ranked 13th in the world. Data from the World Tourism Organization shows that if tourism income increases by 1 yuan, it will lead to income rise from other industries up to 3 to 4 yuan as well as adding jobs directly from the tourism industry to society with 5 to 7 jobs.

The Chinese tourism industry is developing rapidly and smart travel is considered as an important role, which means combining travel with modern technology like mobile information, big data, cloud computing, AI creating and virtual reality. Taking the experience of visitors as the core, they can optimize tourism resources.

Currently, in the most populous country in the world, smart travel is no longer an abstract concept but has become a practical experience for the majority of tourists. Through the Internet, tourists can find out information about the sights and book tickets online. Smart travel has significantly contributed to improving

consumer convenience in each tourist destination, for example, key tourist areas according to the 5A standard of China apply to buy tickets online 24/24.

As early 2017, the Organization for Economic Cooperation and Development (OECD) estimated that China accounted for 23% of the world's total R&D investment; and in the following year, the country's total investment continued to rise to 2.19% of GDP (it was 2.15% in 2017). China not only accounts for 25% of the world's R&D personnel, but also ranks second in the world for international patent applications in 2018 (53,981), just behind the US (55,981).

Another truth in China's Science and Technology growth is the decision to send hundreds of excellent students to study in Western universities. China is even a student import-export network: only 662,100 students went abroad in 2018, while 492,185 international students from 196 countries came to China, according to the Ministry of Education. In the US, for example, Chinese students occupy the top positions among international students with about 369,000 people.

According to a publication by WIPO, Cornell University and INSEAD, in 2019, China ranked third after the US and UK in terms of university quality and where the top place in Chinese schools was Tsinghua University, next are Peking and Zhejiang universities.

In terms of scientific publications, in 2017, China completely overtook the US in number in 2017. In fact, Chinese publications have increased surprisingly by 15% over the past two decades.

b. Korea

The Busan megacity, the second most populous city in Korea, is of great economic

importance. It is the South Korea's largest seaport and among the world's top 10 major container ports. In recent years, Busan has been building into a smart city of the future by applying technology to improve the lives of urban residents.

Busan takes pride of a "first of its kind". In Busan, smart city projects have been implemented to ensure community safety, improve traffic, urban living and save energy. Open data projects and data monitoring systems are underway to monitor traffic flows and interact with emergency services for real-time communication.

Tourists at the 2018 Winter Olympics in PyeongChang, South Korea already had the chance to experience next-generation technologies. With the theme "Passion & Connecting" the PyeongChang Olympic Organizing Committee integrates ICT throughout the Olympics with 360-degree cameras, private viewing angles and 5G technology. Almost every aspect of public life in Seoul supported by technology, from public transport system to the government's emergency warning system.

In addition, Seoul can be seen as the smartest city in the world. Seoul has had a long history of helping people stay connected to technology. In 2012, Seoul began distributing second-hand smart devices to low-income households and those in need. Citizens are encouraged to donate their old devices when buying new ones, thanks to the tax deduction policy of about 50 - 100 USD per device donation.

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Seoul has been running courses in customer smart technologies since 2009, with city-hosted lectures and city-sponsored classes through private educational institutions. Classes for immigrants, low-income people, and the elderly using smart devices for the first time have been hold. Classes like these have attracted more than 47,000 attendees from 2009 to 2011. Not only, they meet the basics of using smart technology, but also these classes will teach a variety of skills to use tools of the smart city of Seoul.

Online electric vehicle technology (OLEV) powers mobile vehicles from the surface of the street while the vehicle moves through the lines using the technology. When a bus crosses one of the technology-assisted marker lines, electricity comes from the electrical cables below the street's surface, generating magnetic fields.

In the capital Seoul, safety services have been in operation since April 2008, combining location-based services and CCTV (Closed Circuit Television) technology to inform for authorities and emergency family members is related to children, the disabled, the elderly and those with Alzheimer's disease or all who voluntarily want to be equipped with a smart device.

Eun-pyeong is a district of Seoul, and the Eun-pyeong u‑City project, which began in 2006 and was completed in March 2011. Eunpyeong u-City is probably a prime example of a smart city. It was the result of a seven-year project and now has 45,000 people living in 862 acres (more than 344 hectares).

The people of Eunpyeong do not need access to the Internet or separate smart devices to use city services, but instead receive practical information through smart devices on the living room walls. For the safety of the people, smart CCTV cameras installed on every street corner will automatically monitor people passing in places with few people.

The city's high-tech street lights reduce energy consumption and help residents access the Internet. The county's u-Green service has a network of sensors that evaluate factors such as water and air quality, transmitting this information directly to public spaces and facilities, equipment in citizen's living rooms.

Visit Korea App, Korea's Smart Travel Manager. With this apps your journey to Korea will be ever easier than before. The VisitKorea app provides information on attractions before your trip, maps and nearby attractions based on GPS while on your trip, and a record of all the things you saw and did to show off afterwards. The Korea Tourism Organization first unveiled the English VisitKorea mobile application in 2011, followed by separate Japanese and Chinese apps in 2013. Late in 2019, the three apps were combined into one, allowing users to obtain the same consistent information regardless of language, as well as switch to a preferred language with ease at any time.

A new feature of the updated app is the My Trip section, adding a sense of adventure and achievement to your trip. The My Trip feature is divided into three distinct functions: Save Trip, On Trip, and Take Trip. Save Trip allows users to manage and save attractions they are interested in. On Trip uses GPS signals to track and record the user's trip itinerary on a real-time basis. Take Trip gives experience points to users for visiting attractions that are listed on the 100 Must-Visit Tourist Spots in Korea. One of the biggest advantages of using the VisitKorea mobile app is receiving personalized recommendations based on your personal settings. Using an analysis of big data, the app picks out attractions and information that may be of interest, based on the users selected preferences, nationality, gender, and age range.

Users can also find nearby facilities and directions through the map feature. The About Korea section provides important information, including currency exchange rates, public transit information, and emergency contact numbers, such as the 1330 Korea Travel Hotline and international embassies, for a safe and convenient trip. Another benefit of using the app is the increased number of discount coupons as compared with what is available on the VisitKorea website. In today's eco-conscious world, not having to print copies is a big win! The app has basic tour courses for each region, which is a great starting point for absolutely true beginners to Korea.

3. Da Nang as a smart city & smart tourism

3.1. Current status in Da Nang city

Industrial revolution 4.0 is dominating a strong and comprehensive way in all fields and countries all over the world, bringing great benefits. Besides, tourists are increasingly active and influenced by technology. So, Da Nang Tourism industry also started to focus on investing in the application of information technology, and smart tourism as a necessary solution in the current context. The tourism industry needs to develop and innovate in the way of attracting tourists. Smart tourism is arguably the indispensable trend of the smokeless industry in its efforts to effectively market the city's products and services. Da Nang Tourism industry focuses on investment and application of information technology, quickly grasping the needs and trends of dynamic and smart tourism.

Da Nang determined to build a smart city not only shifting management and operating from tradition to relying on data and technology but also as one of the driving force projects for socio-economic development of the city in the coming time. Da Nang City is currently focusing on three main economic pillars: high technology, high quality tourism and services and marine economy.

Da Nang City has identified the future goals: Completing the construction of a smart city that synchronously connects with smart urban networks in the country and the ASEAN region. At the same time, Da Nang's smart city project is an inevitable transition from traditional management and administration to using data and technology. The major milestones of Da Nang Smart City are shown in a the following table:

Table 1. The major milestones of Da Nang Smart City

Year	Events
2010	The People's Committee of Da Nang City issued the Da Nang E-Government Architecture
2013	Public Wifi in Da Nang
2014	Da Nang officially implemented the E-Government system
2018	Da Nang has officially implemented the construction of Smart City
2018	Public service chatbot launched

(Source: Danang Government)

Vietnam's central city of Da Nang announced that its smart city project is a key driver of socio-economic development in the future, in addition to a transition to technology-based city management.

3.2. Six pillars of smart Da Nang

The overall smart city goals of Da Nang are:

- Apply the ICT achievements of the Industrial Revolution 4.0 into all fields of socio-economic life

- Create new tools, means and motivation for high capacity of state management

- Improve efficiency of resource use, and optimize resource exploitation

- Improve the competitiveness of businesses, create conditions for start-ups and innovation; provide many services, utilities, a good living environment for people and create conditions for organizations and individuals to participate in the construction of commercial cities

- Achieve the target: building Da Nang into a national city, modern, dynamic, creative, intelligent, developing in the direction of knowledge economy, a startup - innovation - innovation center with an important position in the regional development strategy, an economic center playing the role of the driving force for growth and development of the South Central Coast-Central Highlands.

In regard to Da Nang's aim to become the smartest city in the world, technology has been adopted across six pillars. They include:

- Smart governance: focus on implementing urban network upgrades and expansion (MAN), upgrade and expand the data center with cloud computing solutions, exploit wireless wide area network with 4G and 5G technology; building a centralized monitoring, administration and processing center in the direction of multi-tasking, data sharing platform development,…

- Smart economy: focus on the tourism field with the building of a database, develop a tourism monitor system, issue

smart tourism, develop virtual reality applications in tourism, etc.

- Smart mobility: the city deploys the center for monitoring operations, to form a database of the transport industry and exploit an electronic traffic portal to guide and support traffic activities.

- Smart environment: implement database of environmental monitoring, solid waste management, and waste treatment, monitor automatic water supply and drainage.

- Smart living: complete the security and order monitoring system, electric lighting, school supervision, build an education database and electronic transcripts, database on vocational education, database of citizen health records, electronic hospital.

- Smart citizen: focus on solving start-up support, state with citizens, non-cash payments. All content covers the fields of life, society and is assigned to relevant departments to implement and coordinate the implementation.

- Based on the main pillars, Da Nang can clearly define goals to create specific strategies to build Da nNang into a smart city. Through the application of information and communication technology achievements, the formation of smart infrastructure and databases create usefulness for businesses, residents and visitors. This also helps Da Nang transition from traditional urban management to digital data management, enhancing competitiveness and creating a new impetus for development in all economic sectors.

- To implement these plans and projects effectively, the city has identified and put into three phases of building Da Nang a smart city include:

- Phase 1: In 2020, Da Nang will implement smart infrastructure, platform, and data.

- Phase 2: From 2021 to 2025, Da Nang will smarten up existing applications

- Phase 3: From 2026 to 2030, Da Nang will deploy IT applications on the basis of activities in the previous period.

Da Nang has approved the smart city development plan for the period of 2018-2025 and is expected to be completed around 2030. According to the report, Da Nang is home to many IT companies and is the largest software export market, accounting for more than 36% of the market share.

3.3. Da Nang as a smart tourism destination

In recent years, Da Nang has always prioritized the development of smart cities and smart tourism. "Smart tourism" is now an indispensable component of "smart city" and is becoming a major component in economic growth of many countries. Da Nang is a smart city with all the elements: ICT, physical infrastructure, and IT infrastructure and collect enormous amounts of a resource database. All of these factors have created a Da Nang city called "Smart City". That is the premise for a city whose key economic industry is tourism has the opportunity to develop smart tourism destination.

When Da Nang's tourism products, services and resources combine with the elements that create a smart city this creates a smart tourism destination. Da Nang has always clearly defined the target towards smart tourism. Industrial revolution 4.0 is dominating all fields, cities, countries. Therefore, Da Nang tourism industry always clearly defines the target towards smart tourism. Da Nang focuses on investment in the application of information technology and smart tourism as a necessary solution in the current context. Da Nang has many locally developed smart products such as:

Table 2. The locally developed smart products

Year	Events
2012	Free wifi coverage for tourists and community
2016	Danang FantasCity Ver 1.0 The city launched gopy.danang.gov.vn to get feedback on city services
2017	'Danang FantastiCity' Chatbot Application launched
2018	The Quick Response (QR) codes have been put into use at the Museum of Da Nang. Launched an audio guide for tourists
2019	To implement QR Code in English language on Danang tourism publications
2020	Danang Smart City application on mobile phone City virtual tourism model Danang Da Nang Tourism Promotion Center put a pilot 3D scan experience at Da Nang Museum of Cham Sculpture

(Source: Danang ICT Department)

In the Age of Industry 4.0, the attraction for a tourist destination is the investment and creation of unique and new tourism products through the spread of technology. Smart tourism is built on the foundation of information technology - communication and is part of the smart city. Da Nang has installed about 400 hotspots. Wifi around the city to provide free internet with up to 10,000 connections at a point and offers a lot of smart applications for tourism and tourists. In 2020, the city's Wifi network was officially put into use after trial operation. The wireless network has improved connection quality problems and made it possible for tourists and locals to enjoy a more stable internet connection. The wifi network helps visitors to Da Nang search for addresses everywhere such as: airport, hotels, bus stations, or entertainment places, etc. conveniently and fast.

Da Nang always seeks to respond to information to tourists in the fastest and most convenient way based on the technology infrastructure of the smart city. Da Nang has pioneered the piloting of chatbot application to meet the needs of tourists. This is a big milestone,

marking a transformation in smart travel. Da Nang and Singapore are the first two cities in Southeast Asia to apply chatbot technology to tourism. Chatbot "Danang Fantasticity" is integrated with the social network most used by users, Facebook and has been launched as an application for use on smart mobile phones, which can be installed on operating systems. Guests only need to access the Internet via Wifi to use. Chatbot as a virtual tourist assistant is regularly updated with full travel information including categories: Attractions, Events, Experience, Accommodation, Weather in Da Nang within 3 dates and travel information you need to know (public toilets, ATM locations, hotline numbers ...).

In 2018, information answering service 1022 (also known as Switchboard 1022) was born, managed and operated by the Danang Public Service Information Center. Tourists and residents of Da Nang can look up the calendar of upcoming travel events in Da Nang through Zalo application based on chatbot technology and SMS. In addition, users with Zalo connected to Switchboard 1022 can look up other information such as tourist transport

vehicle activities, land price information. This is a supporting information channel for people and tourists. Da Nang is very interested in building software systems and utilities to support tourists such as: Da Nang Tourism, inDaNang, Go! Da Nang and Da Nang Bus.

Smartphone is an indispensable device in every destination for tourists. At the Danang Museum, visitors can use their own smartphones to scan QR codes mounted on historical artifacts to listen to explanations of the artifacts. This technology is convenient, makes it easy for visitors to enjoy, and especially reduces the pressure on the speaking staff at museums.

Da Nang uses online marketing to promote information on the Da Nang Tourism Portal in many languages; enhance images and videos about Da Nang tourism on Danang Fantasticity tourism applications. Besides, Da Nang also develops information through social networking channels such as Instagram, Danang Fantasticity, Tiktok, Youtube.

Da Nang also cooperates with Fayfay.com - an e-commerce site providing Vietnamese tourism products, and develops and applies the QR Code scanning feature in English to Da Nang tourism publications to publish information, create online publications in pdf format Da Nang Tourism Portal for you to read information and download content.

Da Nang also cooperates with Japan to expand the relationship between Vietnamese and Japanese businesses in the IT field, specifically in digital transformation, big data and augmented reality / virtual reality (AR / VR). With the advancement of technologies, it is easy for tourists to use travel websites, social networks and smartphones. This significantly changes the way travel services are provided to guests.

The needs of visitors are being met by technology. Smart tourism applications have a strong relationship with each other. Without technology applications, visitors will find it difficult to gather information and use technology applications to create a sense of convenience, speed and service for their own travel. However, the development of smart tourism, although effective, cannot avoid challenges and shortcomings. We will propose an intelligent system to address the challenges.

4. A framework to address major challenges

The city is an area where human resources and large software enterprises are concentrated. This is the potential to create a technological initiative to help develop the city in the future. In addition, people and businesses in Da Nang city with high skills and application of information technology are also a solid foundation for the development of the smart city. But Da Nang is in the early stages of smart city development and smart tourism. This means that the city must test and deploy new services, new models, and pilot services using new digital technologies. So, the city needs strategies to suit the city's specific characteristics.

Smart city applications like chatbots just stop at answering and assisting visitors in searching for information individually at destinations. This is not really the link closely with each other. For example, what travelers need is not only tourist information, but the ability to integrate information about tourist maps, hospital addresses in case of emergency, or a quick response system and assist visitors if something happens in an unusual situation.

The core technology of smart travel is sensors and smartphones. In order to use smart applications and access intelligent information sources, tourists depend heavily on access devices and communication networks. If visitors do not actively use smart devices such as smartphones, visitors will not be able to

access ITC infrastructure. This shows a very strong impact on the travelers who need: the destination's smart device availability, the network, and the energy used by personal devices. Although the benefits from smart tourism models in the world are visible, due to the city's infrastructure conditions and suitability, the current technology applications are used in small and scarce ways and not yet consistent or breakthrough. Moreover, the human resource of the tourism and service industry is still lacking a lot compared to the industry's development. To develop smart tourism, Da Nang must have intelligent and experienced human resources. However, the ability of employees to adapt to technology is still slow. In order to develop smart city tourism sustainably and effectively, the city needs to incorporate the main pillars of the smart city closely. Economy is the main driver of a smart city as well as smart tourism. It must exploit the economic factors for the city to have the opportunity and potential to develop smart tourism.

Governance needed to be adjusted in a more progressive way and reduce complicated procedures when applying new technologies. For example, smart parking is used technology to manage but still many processes lead to ineffective management.

The environment has a significant impact on tourism. The number of tourists visiting tourist sites, tourist destinations in a given period, and space will affect landscapes and tourist infrastructures; for example hotel wastewater treatment, tourism waste. Applications that help the city control the data of tourists and guests staying at a given time should be included in order to determine the environmental limit factor.

The living, integrated applications are needed, namely: smart health care, food hygiene, emergency services and disaster prevention for convenient access to information such as a smart app is needed for medical tourism. For example, the city should develop technology applications such as using GDS technology or geofencing on mobile applications to assist guests. GDS technology helps customers find attractions, event venues or hotels with attractive promotions and discounts within close proximity. GDS also supports customers to find the place they need in very urgent cases: hospital, police,...

The mobility includes ways of transportation. Smart tourism needs effective smart travel solutions for travelers, facilitating an ecosystem of cooperation and meeting sustainability goals. The city will apply new technology and apply it to vehicles such as automation, IoT-based connectivity, electric energy, and information sharing to reduce traffic congestion.

Smart city is the resonance of many factors and a smart citizen is one of them. Smart citizens are considered one of the deciding factors, as they must have the facilities and the means to become smart citizens. People need to participate in technology solutions, and they also have to play a leading role in designing and creating.

The need to incorporate the elements of a smart city and incorporate technology into each element for visitors to access and experience the destination.
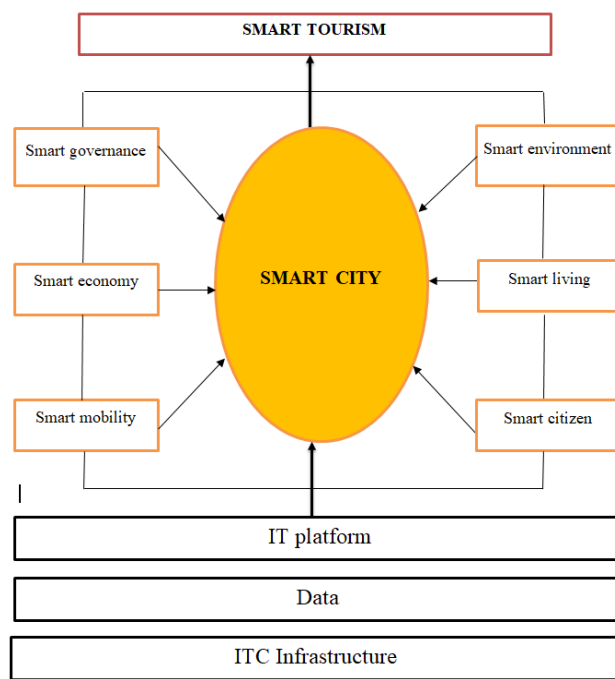
***Figure 3.** Smart Tourism Dynamic Responsive System (STDRS)*

5. Implication and conclusion

Smart tourism is an important part of the development of smart city Danang. In this article, we gathered and learned about the relationship between the smart city and the smart tourist city Danang. In addition, we have fully described the smart technologies used in Da Nang city to create a smart tourist city, based on the six main pillars of smart city that have a strong relationship with smart tourism, as essential factors for smart tourism development. From the technologies and applications being applied by Da Nang in tourism, we have analyzed and given the factors that need to be supplemented to step by step complete the smart tourist city. We take a STDRS-based approach to see more clearly the main pillars of smart cities lying on three platforms: Information technology, data, integrated ITC infrastructure to create smart tourism. In addition to the above analytical framework, smart travel must provide solutions for the core technology of sensors and mobility. At the same time, smart travel needs to be comprehensive in terms of: smart technology, smart consumers (using smartphones and connected), smart travel businesses and smart destinations.

Our research has certain limitations. However, it can be seen that smart tourism is an inevitable development trend of world tourism in general and tourism in Da Nang in particular. Therefore, in addition to the analysis that we give based on the smart tourism development of Da Nang, to develop smart tourism, Da Nang needs to continue to improve institutions and policies, define models and develop pilot implementation, develop human resources with technological qualifications and strengthen international cooperation on science and technology, promote propaganda and raise awareness of smart tourism development.

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