

Conceptual and integrated smart tourism model

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Abstract – Today the Internet of Things and Smart City receive great attention from researchers, because they become an important technology that promises the life of a smart human being, allowing communication between objects, machines and all things together with humans. According to technology Internet of Things, the world will become smart from all aspects, because Internet of Things provides funds for smart cities, smart health, smart homes, smart tourism, etc. In this scientific paper is presented model for the implementation and design of smart tourism. On the basic structure of a smart city we will build a conventional model of smart tourism where each structure will be divided into its subgraph. Finally, we will make a conceptualization of the level of access to smart tourism.

Keywords— internet of things, smart cities, smart homes, smart health, smart tourism.

I. INTRODUCTION

In the last few years, explosive growth of information and communication technologies has been observed because of improved design of hardware and software. In a simple explanation, the smart city is a place where traditional networks and services are made more flexible, efficient and sustainable using information, digital and telecommunications technologies to improve their operations for the benefit of its citizens. One definition of a smart city is: "a city that connects physical infrastructure, information and technology infrastructure, social infrastructure and business infrastructure to exploit collective intelligence in the city". Also, according to research by M. Sajid Khan [1] a smart city is a community in which citizens, business companies, knowledge institutions and municipal agencies cooperate with each other to achieve integration and efficiency of systems, citizens engagement and continuous improvement of quality of life. Smart tourism is considered a revolution in the tourism industry, including innovative and transformative theoretical and practical approaches to the sector. As a result of its application in the tourist context, the benefits can be seen in greater mobility and better accessibility in destinations, evolution of tourist processes and experiences. The term smart tourism originated in the 2000s [2], based on two main references: smart city [1] and e-tourism. There are different ways in which the term smart is used and possibility of using "smart" or "intelligent". Generally, [3] smart is related to ability to understand and solve problems using knowledge, data and information. Smart tourism is also based on the "wisdom of tourism", which indicates that both are the same. The author [4] also described smart tourism as synonym for intelligent tourism. The purpose of this panorama highlights the challenges of the study areas involved in this research and on the other side there are opportunities for further research consolidating the effective

literature for each concept in the case of smart tourism, which is in our focus.

II. CONVENTIONAL MODEL OF SMART TOURISM

The aim of this work is to discuss the dimensions needed to build smart tourism and provide smart services. Specifically, this work will focus on infrastructure, management and components of people's knowledge. As a result of it, this research proves the importance of any dimension in the construction of smart tourism and smart services. The structure of smart tourism will be developed according to 6-dimensional structure of the smart city, where each component contains elements that allow smart cities to communicate. Figure 1 shows the basic 6-dimensional structure of the smart city [5], while Figure 2 shows a model of smart tourism created on the basic 6-dimensional structure of the smart city. In Figure 2 is created basic structure for smart tourism. Therefore, all four branches in the base will be expanded into several branches or subgraph of projects and applications for information technology. A chart shows the connection, interaction and cooperation between the different parts. Each part is analyzed and expanded independently.

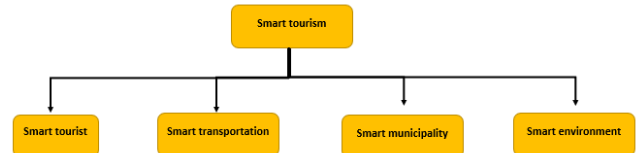


Fig.1 General model with four dimensions of smart tourism

A. Smart tourist

Before technology and infrastructure, smart tourism requires creative, responsible, adaptable and productive citizens/tourists. In the absence of a smart citizen/tourist, smart services will not be used. As mentioned in the research [5], smart city cannot exist without smart people. Citizens/tourists [6] are key part of this urban development based on knowledge and get all information. Therefore, it is necessary better education, promoting initiative and creativity of people in order to increase the competences of citizens/tourists on smart tourism [7].

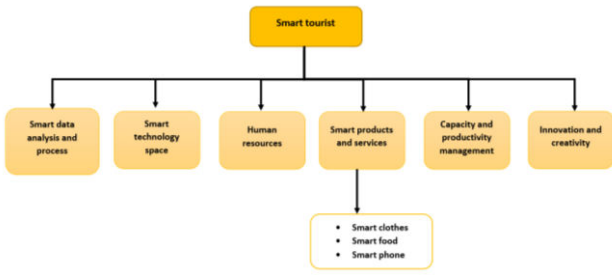


Fig.2 Proposed sub model of a smart tourist

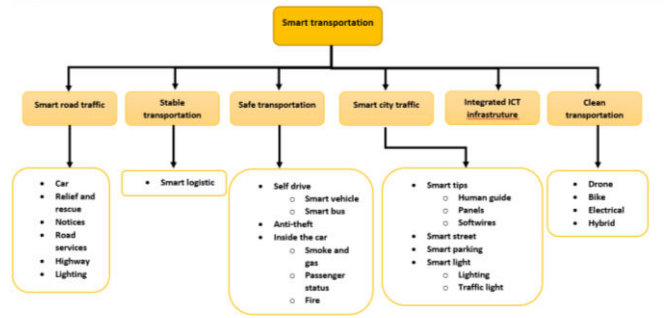


Fig. 4 Proposed sub model of smart transportation

B. Smart municipality

Municipal management,[8] through which the services and interactions of private and public organizations can integrate in such a way that the city can function as an effective organism is called smart management. According to our model, several factors are involved in the formation of smart management. Basic important factors like technological infrastructure, ICT network infrastructure and smart technologies, allow tourists to participate in decision making, collaborate and have access to certain data and information for the city. In one study, the smart municipality defines it as a region that correctly identifies its strengths sides and opportunities. Also it coordinates available and limited resources to produce maximum in that areas.

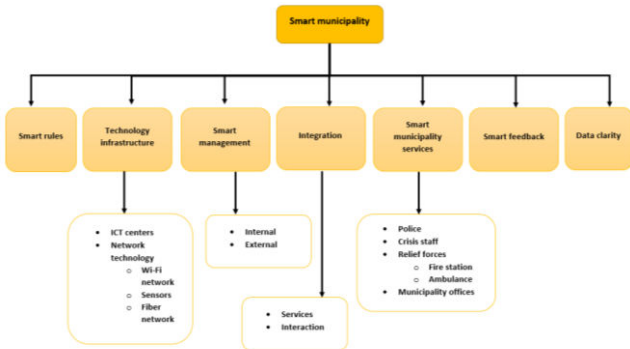


Fig.3 Proposed sub model of smart municipality

C. Smart transport

According to our model, smart transport means support for integrated ICT infrastructure, integrated transport, logical system, clean transport, safe transport, smart urban and road transport. The most important goal of smart transport is to reduce carbon in the air. Clean transport systems can include hybrid vehicles, electric vehicles and bicycles that have the lowest pollution levels. As urban life increases and the number of vehicles in cities, smart transport will reduce urban transport and crowd, which includes software, signs and human guidance to know condition of traffic on the streets [9], creating smart streets [10] and smart parking lots [11] in the city. Also to reduce energy consumption there will be smart lighting system [12] for traffic lights and urban lighting in the city.

D. Smart environment

The smart environment [13] will improve the quality of tourist life by creating healthy and safe living conditions. The smart environment in our model includes important components such as smart energy, smart advertising, smart monitoring and control of pollution, smart buildings. Each of these components include subcomponents to achieve its goal. The main goal is promoting greater use of renewable sources and less consumption of resources. The smart environment also provides the possibility of intelligent measurement and monitoring, as well as better control of pollution in the city. The smart environment also includes noise monitoring and air pollution [14], waste management [15]. A smart environment can also make great progress in smart tourism using the Internet of Things.

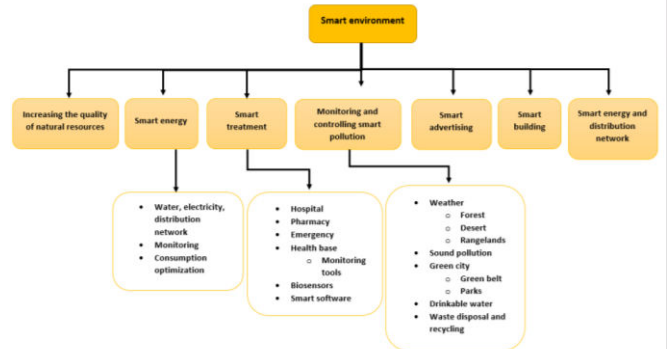


Fig.5 Proposed sub model of smart environment

INTEGRATED SMART TOURISM MODEL

We created a basic structure of smart tourism where each attribute/member of that diagram is branched and explained in subgraphs. Therefore, when each attribute connects in a diagram, we can say that we propose integrating the smart tourism model. Figure 6 shows where we connect all parts and identify the connections. It is obvious that different societies will change or localize connections based on their cultures, economic and political needs. In order to maintain some security of this integrated model, we can say that security includes three components of physical security, information security and all issues related to smart tourism in a smart city. Most of the operations in a smart city, where will have smart tourism will be based on ICT technology, Iot technology and adequate hardware and software infrastructure.

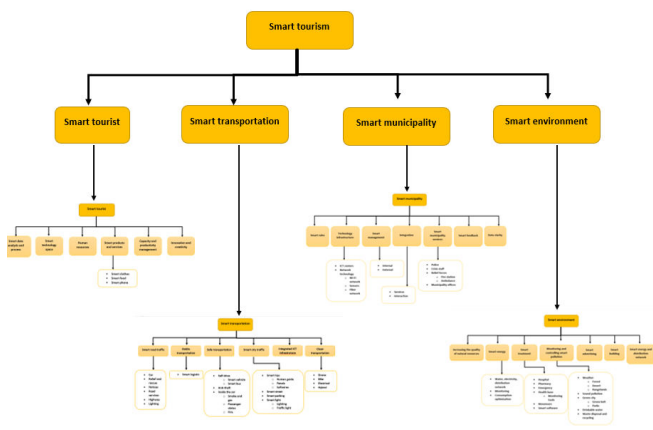


Fig.6 Integrated model of smart tourism

CONCEPTUALISATION OF LEVELS FOR ACCESS TO SMART TOURISM

E. *Smart tourism*

Conceptualized such as tourism [16] and supported by integrated efforts in a destination to collect and aggregate/harness data derived from physical infrastructure, social connections, governmental/organizational sources and human bodies/minds combined with the use of advanced technologies to transform this data into on-site experiences and business value propositions with a clear focus on efficiency, sustainability and enrichment of experiences.

F. *Smart tourist*

A defined tourist [17] is the one who, by being open to sharing their data and using smart technologies, dynamically interacts with other stakeholders, co-creating an enhanced and personalized smart experience.

G. *Smart tourism business*

According to research [16] the business layer refers to the complex business ecosystem that creates and supports the exchange of tourism resources and the co-creation of the tourism experience. The business level is based on access to shared data, promoting cooperation and sharing of resources between companies. [18]

H. *Smart tourism city*

The smart tourism city is seen as arising from the convergence between the components of the smart city (services, infrastructure, etc.) and smart tourism (transport, accommodation, gastronomy, etc.), and being defined as an innovative tourist destination, which guarantees sustainable development, which facilitates and improves the interaction of visitors with experiences at the destination and also improves the quality of life of residents [19]

I. *Smart tourism destination*

The smart tourism destination represents a consolidated innovative space, based on the territory and a state-of-the-art technological infrastructure. A territory committed to the environmental, cultural and socioeconomic factors of its habitat, equipped with an intelligence system that captures information in a procedural way, analyzes and understands events in real time, in order to facilitate the visitor's interaction with the environment and the decision-making by destination managers, increasing their efficiency and

substantially improving the quality of tourist experiences.[20]

J. *Smart tourism region*

The smart tourism region [21] defines a smart tourism region as one that correctly identifies its strengths and opportunities and, in addition, adequately coordinates available - and generally limited - resources to produce maximum productivity in the areas that comprise it.

K. *Smart tourism ecosystem*

The smart tourism ecosystem [22] is defined as a tourism system characterized by intense knowledge sharing and value creation, using smart technology in the creation, management and provision of smart tourism services/experiences, as well as assessments of technological developments.

CONCLUSION

A growing trend towards addressing smart tourism is observed in academic research [23], in government projects and even in web searches [24]. A situation that points to smart tourism as a defining guideline in 21st century tourism, indicating a rich field of exploration both in theoretical and practical approaches [25][29]. However, different research limitations [26][27][28][29] and of the practical application of smart tourism [16][30][31][32], show a parallel of needs and opportunities to advance related knowledge to the subject [29]. Among the possibilities observed for this smart tourism to advance both in theory and in practice, it was glimpsed that the broad mapping of the dimensions that support it can support the development of more comprehensive, efficient and sustainable research and projects. This is because, when considering different operational characteristics of smart tourism, it becomes possible for its applications to contemplate each of these characteristics, whenever feasible, of course, instead of focusing only on specific or more restricted points. Since the contemplation of every nuance of smart tourism can allow for greater success in its applications. Based on this perspective, the integrative review of the literature on smart tourism, carried out in this research, prospected and evidenced fourteen dimensions that underpinned applications of smart tourism in different contexts (geographic, methodological, etc.). Dimensions in which one can observe, on the one hand, topics that are already well explored in smart tourism, such as technology and experience; and, on the other hand, topics that can still receive greater attention and also add greater value to smart tourism, such as knowledge management and security. Thus, the results of this study can also support the theoretical and practical deepening of attributes still little explored in smart tourism, as well as the evolution of smart tourism as a whole.

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