Smart City and Smart Tourist Destinations: Learning from New Experiences in the 21st century

Janaina Cardoso de Mello

UFS – Universidade Federal de Sergipe

São Cristóvão, Sergipe, Brazil

ORCID: http://orcid.org/0000-0002-5060-0691

E-mail: janainamello.ufs@gmail.com

Fabiana Faxina

IFS – Instituto Federal de Educação, Ciência e Tecnologia de Sergipe

Aracaju, Sergipe, Brazil

ORCID: http://orcid.org/0000-0002-6281-4726

E-mail: fabi_fa@hotmail.com

Abstract

Digital transformation has been a worldwide reality since the late 1990s. However, the 21st century has promoted its acceleration and scope for its use. Tourism professionals have sought the benefits that digital connections via smartphones bring to the diffusion and negotiation of services and products. However, young people from the internet age seek autonomy in the elaboration of their own travel itineraries, contributing to the emergence of intelligent tourist destinations. Based on the correlation with the principles of smart cities that increasingly become the goal of global managers, this study seeks to demonstrate the potential of the insertion of the tourist segment in this new perspective of social behavior. The results show that the co-creation by the travelers in search of experiences of impact in their lives is here to stay with QR Codes and Apps of cell phones. Information and digital communication technologies bring greater autonomy and creativity to the universe of tourists.

Keywords: Smart City; Young Travelers; Intelligent Destinations; News Social Behaviors.

1. Introduction

Since the early 2000s, authors dedicated to research on the relationship between Tourism and the use of digital technologies such as Gretzel (2006, 2011), Sigala et al (2015), Huang et al (2017), Li et. al (2017, 2018), Xiang et al (2017) and Shu-Tai Wang & Ping-Ho Ting (2020) highlighted the emergence of Intelligent Tourism as a vector that approaches Big Data, technological innovations, digital marketing, online market research and social networks to support managers and tourism agents in optimizing their resources and attractions for the connected population.

However, in addition to the traditional suppliers of products and services, tourists themselves have also

sought to develop greater autonomy in planning trips. They are increasingly using smartphone apps to develop personalized itineraries, seek more competitive prices and alternative places where they can experience different experiences. In this regard, smart cities favor this approximation between individual and collective expectations for resources including Internet of Things (IoT) devices, computing platforms, and data storage media (SINAEEPOURFARD; KROGSTIE; SENGUPTA, 2020) geared to tourism. Smart cities are categorized based on a set of improvements for digital access to citizens in various segments such as: smart economy (ECO), intelligent population (PEO), smart management (GOV), intelligent mobility (MOB), intelligent environment (ENV), intelligent living conditions (LIV) (SOJDA, 2020).

Thus, the objectives of this research are to relate the potential offered by smart cities to tourism, as well as to understand how the new generations take ownership of technological mobile devices contributing to the development of smart tourist destinations. The present study is purely based on secondary data. Therefore, for this purpose the bibliographic, analytical, and descriptive method was used.

2. Smart City and Smart Tourism: context and research

The increase in the urban population, the complexity and competitiveness of cities pointed to the role of Information and Communication Technologies (ICTs) in the coordination of activities and services, involving connected, better informed and engaged citizens (BUHALIS; AMARANGGANA, 2014).

Between the end of the 1990s and the almost twenty years of the early 2000s, debates around smart city projects expanded around the world. Tests have been carried out in Europe, the Americas and Asia, from London to Boston and Hong Kong, from Barcelona to Amsterdam and São Paulo in Brazil, as citizens around the world demand that their local governments offer urban spaces designed to improve their quality of life (DAMERI; ROSENTHAL-SABROUX, 2014).

At the end of the 1990s, the publication Intelligent Environments - Spatial Aspect of the Information Revolution already relied on virtual technologies to define a smart city as: "a virtual reconstruction of a city, or as a virtual city" (DROEGE, 1997).

The adhesion of several countries of the European and Asian continents to the proposal of smart cities made each research group in academic institutions or municipal urban planning, seeking to define the concept according to their possibilities of understanding and adaptation to their realities. In this way, five definitions summarized the ideal of implementing multiple ideas (table 1).

Table 1. Smart City concepts in use in Western, Eastern and European research Asia
(Mkrtychev et al., 2018)

Origins	Definitions
Standardization Administration of China - the smart cities standardization working group. Chinese nationals - SAC	Smart City is a new concept and a new model, which applies the new generation of IT to facilitate the planning, construction, management and intelligent services of cities.
British Standards Institution - BSI/PAS 180	Smart City is a term that denotes the effective integration of physical, digital and human systems in

	the environment built to provide a sustainable, prosperous and inclusive future. for its citizens.
Smart Sustainable Cities Focus Group - ITU / T FG	A smart and sustainable city is an innovative city that uses ICTs (information and communication technologies) and other means to improve the quality of life and the efficiency of urban operation, services, and competitiveness, while ensuring that it meets the needs of generations present and future in relation to economic, social and environmental aspects.
Technical Board of Directors / Smart Cities Strategic Advisory Group - ISO TMB	A smart city is one that dramatically increases the pace at which it improves its socio-economic and environmental results (sustainability), responding to the challenges of improving the way it involves society, how it applies collaborative leadership methods, how it works in city disciplines and systems and how it uses information from data and modern technologies to offer better services and quality of life to those involved with the city, now and for the foreseeable future, without unfair disadvantage to others or degradation of the natural environment.
European Smart Cities - Vienna University of Technology.	A Smart City is a city that performs well in six key areas of urban development, built on the "smart" combination of endowments and self-determined, independent and conscious citizens

The table above shows the smart city concepts used in this study.

According to Komninos (2002), all smart cities are also digital cities, but not all digital cities are smart. Hence the need to distinguish the basic concepts in theoretical reflection and constitutive practice. While the digital city uses online services adapting to technology what it already offered personally to the community regarding administration (web portal), the smart city creates services for citizens with digital spaces for consultation and online collaborative tools, where there is participation, interaction, and intervention by the population in improving the continuity of products in order to solve everyday problems. The first is based on receiving services from public agencies, the second is based on innovation, being a co-creator of services.

The concept of smart city originates from California (USA), where smart communities are structured, as geographic areas of different sizes, where residents, organizations and government institutions use ICTs to transform territories, promoting cooperation between government, companies, educators, and citizens. Thus, technological improvements encourage the exchange of knowledge between different groups (INVAT.TUR, 2015).

This "Intelligent Community" approach began at San Diego State University (SDSU) to transform the

community, of various sizes and significantly, using Information Technology (IT) (CALIFORNIA INSTITUTE FOR SMART COMMUNITIES, 2001).

According to the California Institute for Smart Communities, there are ten steps to start the process of building an intelligent community, as follows: 1. Better understanding of the concept of "smart community", considering not only technology, but also the economic structure and social; 2. Broad communication of the concept of smart community, decentralizing power to favor its collective appropriation; 3. Creation of a new decision-making mechanism with an emphasis on collaboration between all parties; 4. Assessment of the needs of the community and their definition, based on the reconfiguration of geographical limits, communication technologies, their demands and sense of priority; 5. Vision and mission statement for the smart community, described in up to one page and certified by all its civil and government members; 6. Establishment of goals and priorities, elaborated by collaborative commissions among all interested parties, adopting schedules and assisting in the development of tasks that can be distributed around areas (health, education, transportation, legislation, government services, economics, etc.); 7. Strategic plan for the concept of smart community to become a reality, guiding the development of broadband infrastructure connecting the entire community, of systems and services that benefit the community and an agenda with regulations for the new infrastructure and information services, always updated; 8. Definition of responsibilities and schedules, making the expectations of those involved clear, determining the sources of financing, public / private partnerships and outsourcing; 9. Community interactions, based on zoning, land use, development and control of information systems, using culture as a magnet in the remodeling of space and its social relations; 10. Monitoring, keeping energy, focus and commitment alive in the continuity of the development processes of a new Information Management System (GIS) for the collective construction of a smart community (CALIFORNIA INSTITUTE FOR SMART COMMUNITIES, 2001).

Steventon and Wright (2006) define Intelligent Community as: "an intelligent environment, which incorporates information and communication technologies (ICT) that create interactive environments, which bring communication to the physical world". From this perspective, an intelligent city (in more general terms, an intelligent space) refers to a physical environment in which communication and information technologies, in addition to sensor systems, disappear as they become embedded in physical objects. and in the environments in which we live, travel and work. In other words, technological informational integration becomes part of human life to have its effects naturalized.

Komninos (2006; 2008) draws attention to the fact that smart cities evolve towards a strong integration of all dimensions of intelligence: human, collective, and artificial, available in a City. They are built as multidimensional clusters, combining the three main dimensions.

The innovation that underpins the smart city proposals emerged as a great response to the main challenges facing cities and their residents. In the past, much of the focus of debates gave rise to technological interventions, but the awareness that technology alone will not be enough to achieve the objectives of the smart city has made the centrality of propositions shifted to the human factor. Local communities are the main stakeholders in providing products and services from smart cities around the world and therefore cannot be ignored. Community involvement (or citizen involvement) becomes an essential part of the organizational processes of local authorities to offer innovation in smart cities (MAZHAR et al., 2017).

Although this discussion has already leveraged smart city projects in many states in Brazil, there are still

many spaces missing from this notion as an important factor in urban development via technological communication, since until 2016, they were only inserted in this context: São Paulo, Rio de Janeiro, Curitiba, Brasília, Belo Horizonte, Vitória, Florianopolis, Barueri, Recife and Campinas (SEBRAE, 2016). Most Brazilian cities listed as smart cities have turned their development towards technologies applied to urban mobility systems with the adoption of Light Rail Vehicles (VLTs) or Bus Rapid Transit (BRTs), "citizen service" information systems in sites of city halls (varied documents, property records, processes), garbage collection and recycling, monitoring of pollution levels, intelligent use of energy matrixes, among others.

ICTs have supported cities in addressing their social challenges, increasing the development of Smart City in facilitating continuous access to value-added services, both for their citizens and for tourists and city visitors who now have real-time information about the public transport network, in addition to promoting interconnectivity between the city's stakeholders through the "Internet of Things" (Internet of Things - IoT), allowing cities to dynamically engage with their stakeholders (BUHALIS; AMARANGGANA, 2014).

In his research, Yongda (2017) starts from two initial concepts: first, "smartness" to describe innovation and transformation linked to new technologies, which can integrate and share data in real time for communication and collaboration in decision-making processes. The second term, "smart technology" was thought of as a technology with a degree of intelligence that supports new forms of collaboration and value creation, leading to innovation, entrepreneurship, and competitiveness.

In 2012, the city of Palma de Mallorca (Spain) approved its "National Comprehensive Tourism Plan" bringing together the concepts of sustainability, knowledge, innovation, and technology aimed at tourist destinations. From this proposition, the definition of "smart tourist destinations" was arrived at as:

"An innovative space, accessible to all, consolidated on cutting-edge technology, which guarantees the sustainable development of the territory, facilitates the visitor's interaction and integration with the environment, and increases the quality of their visit to the destination" (SECRETARIAT OF STATE OF TOURISM, 2018).

We sought to develop comprehensive intelligent systems capable of facilitating the integration and interaction of the tourist with the interpretation of the destination on a chronological basis (before, during and after the trip), contributing with elements that guide the interpretation of the surroundings, speeding up the decision-making process. decisions and increase the quality of your vacation, leisure, and leisure experience (MUÑOZ; SÁNCHEZ, 2015).

In 2015, the "Libro Blanco de los Destinos Turísticos Inteligentes" by Francisco Javier Blanco Herranz, brings the concept of intelligence (smart) is presented, in a multivariate way, as: expression of digital exchange, projection of the future, collaborative experience, focus of DTIs in Public Policies, city as a technological platform for innovation, competitive factors, articulation of knowledge via systems, integration with sustainability, among other topics.

A more organizational view of the assumptions is interwoven with Intelligent Tourist Destinations. The requirements are sustainability, financial viability, and public / private collaboration. Its mission is to convert a tourist destination into a DTI, using innovation (processes or tools) and technologies (information, communication, efficiency). The results are demonstrated in the increase of business competitiveness and public initiative, in the improvement of the quality of the visit and the quality of life of the residents. There

will also be the generation of efficiency, employability, income (tax, wages, business) and satisfaction with the enterprise. Thus, agents - public administration, private companies, and training entities - will be working in the same territory in a collaborative way (MUÑOZ; SÁNCHEZ, 2015).

Therefore, smart tourism encompasses a new generation of ICTs that are made available through a platform - using IoT, cloud computing, mobile technology, and AI - reports of tourist attractions, consumption of tourist products, in addition to the results of research in the tourist area which can be made available in a language intelligible to companies and organizations (YONGDA, 2017).
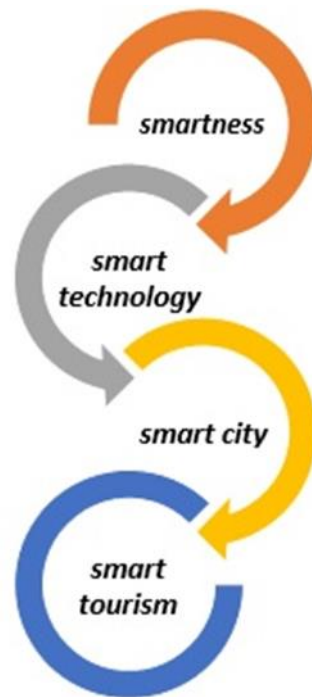

Figure 1. Diagram of smartness influence.
The figure above shows the smartness cycles adopted by service and product segments.

More assertive and intelligent technologies seek to respond to the requests of tourists and stakeholders, focusing on facilitating consumer decision-making processes (Figure 1). They do not aim at the universality of social groups, in view of their heterogeneities, mainly in relation to the way they handle digital resources (greater proximity or resistance). Its focus is on those who have adopted smartphones as more efficient, fast and hyperconnected solutions.

3. DICTs and new consumer trends in smart tourism.

Digital Information and Communication Technologies (DICTs) contribute to the generation of experiences with added value for tourists, in addition to improving efficiency and supporting the automation of processes for organizations related to tourism and hospitality. Thus, the development of smart cities can incorporate the formation of "smart tourism destinations", since the use of technology in the environment of the destinations enables the enrichment of tourist experiences and increase the competitiveness of destinations (BUHALIS; AMARANGGANA, 2014).

That said, "[...] Tourism and ICT can be considered two sides of the same coin. If a historical analysis of

the evolution of tourism is carried out, it is easy to see that it is intricately linked to technological evolution" (MENDONÇA, 2002), aiming at making the offer of services more rational to obtain an advantage over the competition. An example of using ICT with respect to information and dissemination is the Quick Response Code (QR Codes).

Historically the QR Code was launched in 1994 by Denso Wave and Masahiro Hara was responsible for its development. There was still uncertainty on the part of Hara about the ability of her innovation to replace the traditional barcode. Unlike the old code, the bidirectional QR Code intended to "create a simple reading system that encodes a lot of information in several directions, whether transversal, up or down" (SOUSA, 2014).

It is worth mentioning that, due to their high potential for storing information, QR Codes were initially used in the production management of the automobile industry and their dissemination was expanded due to their free availability, without the use of a patent by their creators. Increasing its use more generally, in 2002, with cell phones being able to read QR Codes (SOUSA, 2014). This tool "is also a code that is resistant to damage and corrects errors that may arise, and data can be restored up to a maximum of 30%" (SOUSA, 2014) of the information present in memory. Thus, if the QR Code is streaked somewhere, missing any element will not present any damage that would prevent its reading.

The use of QR Codes with two-dimensional images digitized by cell phone cameras as a digital marketing tool has diversified its area of commercial application in recent years due to the development of mobile technologies, greater popularization of smartphones, greater speed, and digital security in the transmission of information desired.

"The trend in the marketing community is the use of QR code. They are found on magazine pages, billboards, cereal boxes, beverages, weekly advertisement papers, and other marketing mediums. A qualitative focus group study conducted in Japan found that loyal customers would use QR codes to access promotional information and discounted items […]. Even educational institutions, museums, and various public places use QR codes to provide more information about an on-going program, a particular event, or an object […]. The primary goal of marketing is to interact with a customer or a potential customer. The QR code can help to achieve it by providing better engaging service to customers than other traditional ad mediums" (CATA et. al., 2013).

Teuta Cata et. al. (2013) call attention to a Mobile Marketing System (MMS) framework with different degrees of interaction between the product's offer and the customer's consumption. In this way, you can direct the consumer to a static informational website or to an application that involves direct user participation, unraveling the secrets of the codes that advertise the service and products.

It is up to the service / product manager to pass on the necessary guidelines to website and application developers, as well as throughout the marketing process to provide users with autonomous procedures for reading codes for accessing data (software to scan, how to download them) for the mobile device, how to position the camera correctly on the QR Code, etc.).

When addressing the use of ICTs applied to tourism, Mery Morales, supported by the studies about Baeza (Spain) in 2000, emphasizes "usability", that is, the ability of a software to be understood, learned, used, and perceived in an attractive way by the user. Therefore, it highlights five necessary attributes: ease of learning, performance speed, error rates on the part of users, time retention and subjective satisfaction

(MORALES, 2017). Also citing John Cato, he suggests a few more attributes for proper technological use, namely:

"Control: Users should feel that they have control over the application, and not the other way around. Skills: Users should feel that the system supports, complements, and enhances their skills and experience. Privacy: The system helps users to protect their information or that of their clients" (MORALES, 2017).

Michela Grimaldi and Maria Teresa Natale (2016), when addressing the theme of applications at the service of cultural heritage in Italy, highlight the contemporary need for cultural institutions and communities to make use of new technological tools at affordable cost, citing the use of digital cameras and websites to disseminate information and interact. The authors propose the creation of a synergy between culture and technology combined with the routing of heritage sites for the purpose of enjoyment during visits.

The role played by ICT in operationalizing the internal management of organizations, also establishes relationships with their external environment and allows for articulation between all the subjects of the tourism system (SERRA, 2008).

The Future Traveler Tribes 2030 report, Understanding Tomorrow Traveler, published by Amadeus Traveler Trend Observatory in April 2015, stated that travel trends in the coming years will be defined by the intensive use of technologies, given that smartphones can already be used. used in radically different ways by travelers, with apps that allow users to search and store itineraries meticulously, but also improvise on the spot. This mobile technology aims to provide the autonomy of travelers in achieving their goals.

In the perspective of this digital tourism, it is based on the premise that the consumer, his behavior, and tourism profiles significantly affect the operation of the tourism marketing model (HAPP; IVANCSÓ-HORVÁTH, 2018).

Understanding consumer perceptions is the key to the success of technological innovations in any service area, including tourism. Perception is a dynamic process by which the perceiver gives meaning to the "raw materials" of the environment. The individual is not a lifeless object, but an actor. Perception interposes, between the real world and behaviors, as a filter between a transmitter (the real world) and a receiver (men). Therefore, it is affected by several factors such as memory, behaviors, codes, values, beliefs, and way of life (KAZANDJIEVA; FILIPOVA, 2018).

In this regard, four generations of consumers have been worrying researchers in recent years, whose periodization of birth has supported the understanding of their socio-cultural consumption behaviors. These generations are named as: 1) Silent Generation (born between 1925 and 1942 - through the Great Depression and World War II), 2) "Baby Boomers" generation (born between 1950 and 1960, as children of the post-demographic explosion World War II), 3) Generation X (born between 1960 and 1970, those who experienced the most intense times of the Cold War) and 4) Generation Y (born between 1980 and 1990, witnessed the advancement of technology with the creation of Word , Wide, Web - www.). Generation Y - also known as "millenials" - has proved to be extremely influential, adept at cultural, autonomous, individualistic, and anti-corporate diversity, but ethical and in search of qualitative life experiences different from previous generations (DOUGLAS et al., 2018).

Developers of tourism consumer technologies via Apps usually target Generation Y, belonging to the global youth, since they are those who are connected, immersed in social networks, making hedonistic "breaks" that combine work with pleasure, are fans of online crowdfunding platforms, followers of Steve Jobs, move

between different groups, seeking experiences with higher quality of life. Therefore, when dealing with tourism, starting in 2017, it is necessary to consider the opinion of the traveler (to increase customer loyalty) and address the "millenials", offering them personalized experiences in hotels and travel planning. Thus, customers should receive travel ingredients that not only involve airline tickets and hotel stays, but also include VIP access to the newest restaurants and many extraordinary experiences (HENCHE, 2018).

Generation Y wants an integrated technology in all parts of their lives and expects it to be central to their leisure, work, and study experiences. Generation Y embraces technology as they grow up with it. They communicate in the virtuality of social networks and text messages, expecting quick feedback and recognition and, as a result, are sometimes blamed for having poor communication and problem-solving skills in the physical world. Studies show that Generation Y prefers work environments where technology is used more, and they tend to take technology for granted (DOUGLAS et al., 2018).

The Infographic prepared by Ponto Eletrônico Box 1824 gives a playful visibility to the behavior of consumers from the last three generations (from 1940 to 1990), highlighting the roles played by each in the consumption activity from its historical context, experiences, ethics, and attitudes (Figure 2).
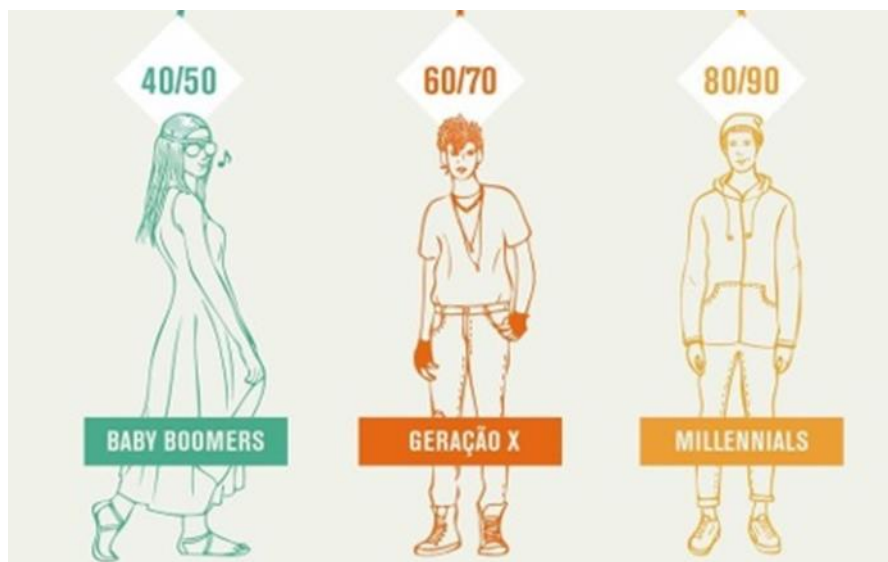
BABY BOOMERS	GERAÇÃO X	MILLENNIALS
Post-World War II	Cold War	World Wide Web
Contesters	Individualists	Connected
Linear Reasoning	Linear Reasoning	Nonlinear reasoning
Peace, Love, Free Sex and Power Flower	Live the search for pleasure without guilt	Make hedonistic breaks and combine work with pleasure
They earned the right to be young	Consolidated economic power	Crowdfunding
Community x City	They are divided into groups	They move in different groups
House key	Room key	World key
Libertarian Youth	Competitive Youth	Global Youth

Figure 2. Comparative behavioral generational infographic.

Note: Adaptation of the Point Electronic Box Infographic 1824 (2018), from:
https://www.hypeness.com.br/2012/01/infografico-mostra-a-diferenca-dos-jovens-dos-anos-50-70-e- 90/
The figure above shows an image of three generations of young people related to the changes and an explanatory table of their trends and behaviors.

The development of smart tourism seeks to employ digital mobile connectivity to create smarter, more meaningful, and sustainable connections between tourists and their destinations and represents broader efforts to imagine tourism as a form of deep civic engagement and not just a simple way of consumption (YONGDA, 2017).

Combining the smartness of technology with tourist destinations requires a dynamic interconnection of interested parties through a technological platform on which information related to tourist activities can be exchanged instantly. This integrated platform must have multiple points of contact, which can be accessed through a variety of end-user devices, which will support the creation and facilitate real-time tourism experiences, improving the effectiveness of managing tourism resources across the destination, at the micro and macro levels. In this way, a Smart Tourism Destination takes advantage of: (1) Environments with technological resources; (2) Interactive processes at the micro and macro levels (3) End-user devices at multiple points of contact; and (4) engaged stakeholders who use the platform dynamically as a neural system. The goal is to use the system to improve the tourism experience and improve the effectiveness of resource management to maximize destination competitiveness and consumer satisfaction, in addition to demonstrating sustainability over an extended period (BUHALIS; AMARANGGANA, 2014).

Despite technological innovations for cities and tourism being integrated into the dynamics of globalization, there is an increasing clamor on the part of Generation Y for ambiences of specificities and exclusivity, mostly linked to traditional cultures, experiences in their diversity and attractions related to environmental sustainability and ways of life in smaller towns, far from large cities. At the same time, due to their own definition of hyper connection, they request that the information that leads them to these spaces, experiences and products emanating from popular culture be in the orbs of cyberculture.

The latest trends in demand have revealed that so-called "last or third generation tourists" use their stay in urban destinations to seek out rewarding and unique experiences. This turns passive viewers into active tourists. Instead of "observing", they travel to a destination to "do" things, interacting more with the local culture (HENCHE, 2018).

On the Sustainable Tourism trail, the need to "maximize social and economic benefits for the local community and minimize negative impacts" is emphasized to encourage social development in the community, employment opportunities, fair trade, sustainable products, policies against harassment and exploitation and equal employment opportunities (HERRERA et al., 2018).

The "know-how" of artisans from small communities, whose products are often recognized as cultural heritage and have quality certification through the IG, has attracted the attention of local managers due to the tourist appeal that this production can represent, enabling the generation of demand for tourism and, consequently, for the other sectors of the production chain. Its link with the creative economy, sustainability and competitiveness can positively re-signify the lives of producers/residents and, at the same time, offer a tourist experience of quality and uniqueness. In this sense, the promotion of these locations through a

digital marketing tool intends to be inserted in this new trend of tourist consumption.

4. Conclusion

Increasingly, tourists who handle the resources of cyberculture seek to plan their visits individually and are no longer interested in a list of standardized attractions, but rather reveal their expectations of experiencing playful, new, surprising experiences that allow them to know the areas outside traditional itineraries, exchange lively and unique ideas with residents and their local culture.

The key software challenge for tourism focuses on creating a good mobile experience that works for its target audience, Generation Y, hyperconnected in contemporary times and eager for interactivity, inspired by an ethics of sustainability, in search of significant travel experiences and sharing them in real time.

The tourist app brings to the heart of the discussions the development of a culture of smartness, smart tech, smart city, smart tourism, smart tourism for communities, ICTs applied to tourism, Intelligent Tourist Destinations, the behavior of tourist consumers before their generations of birth, etc.) providing subsidies for the professional practice of tourism specialists and stakeholders. Learning from digital information and communication technologies helps to offer better products and services to travelers.

5. Acknowledgement

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