Teresa Guarda · Filipe Portela ·
Jose Maria Diaz-Nafria
Editors

# Advanced Research in Technologies, Information, Innovation and Sustainability

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# Preface

The need for a greener and more digital world leads academia, governments, industry and citizens to look for emerging, sustainable, intelligent solutions and trends.

These new solutions and ideas must promote communication and ubiquitous computing between society agents, i.e., citizens, industry, organizations, net-worked machines and physical objects, and provide a promising vision of the future integrating the real world of knowledge agents and things with the virtual world of information. The emerging approaches in study or development can address several dimensions with a technological focus like Information, Innovation and Sustainability and topics: Computing Solutions, Data Intelligence, Ethics, Security, Privacy and Sustainability.

These topics are closely related to the field of Information Systems (IS) because all of them involve the use and management of technology and data to achieve specific purposes or goals. Computing Solutions are a crucial aspect of information systems as they provide the technical infrastructure and tools for organizations to manage and process data. Data Intelligence is also a key area of information systems as it involves the collection, analysis and interpretation of data to support decision-making and problem-solving. Sustainability is becoming an increasingly important aspect of information systems as organizations are recognizing the impact of technology on the environment and are looking for ways to reduce their carbon footprint. Ethics, Security and Privacy are also essential aspects of information systems as they involve the responsible and secure use of technology and data to protect individuals and organizations from potential harm.

The change observed in society modifies the landscape of human activity, particularly regarding knowledge acquisition and production, offering new possibilities and challenges that need to be explored, assessed and disseminated.

To expose and disseminate this, ARTIIS arose in 2021. ARTIIS is an international forum for researchers and practitioners to present and discuss the most recent innovations, trends, results, experiences and concerns from several perspectives of Technologies, Information, Innovation and Sustainability. This book is split into three volumes and contains a selection of 113 papers accepted for presentation and discussion at the International Conference on Advanced Research in Technologies, Information, Innovation and Sustainability (ARTIIS 2023) and its workshops. The third edition of ARTIIS, realized in 2023, received 297 contributions from 44 countries worldwide. The acceptance rate was 38.04%, 98 regular papers and 15 short papers.

The papers accepted to ARTIIS 2023 are published in the Communications in Computer and Information Science series (Springer CCIS). It is indexed in DBLP, Google Scholar, EI-Compendex, SCImago and Scopus. CCIS volumes are also submitted for inclusion in ISI Proceedings.

The conference proceedings are published in 3 CCIS volumes. The first 2 volumes (CCIS volumes 1935, 1936) consist of the peer-reviewed papers from the main conference track. In addition, 1 volume (CCIS 1937) contains the peer-reviewed papers of the 10 Special Sessions.

The first volume of the book contains all the papers on two topics: Computing Solutions and Data Intelligence:

- Computing Solutions addresses the development of applications and platforms involving computing and concerning some area of knowledge or society. It includes topics like Networks, Pervasive Computing, Gamification and Software Engineering.
- Data Intelligence focuses on data (e.g., text, images) acquisition and processing using smart techniques or tools. It includes topics like Computing Intelligence, Artificial Intelligence, Data Science and Computer Vision.

The second volume contains all the papers about Sustainability, and Ethics, Security and Privacy:

- Ethics, Security and Privacy shows a more strict and secure area of Information Systems where the end-user is the main concern. Vulnerabilities, Data Privacy and Cybersecurity are the main subjects of this topic.
- Sustainability explores a new type of computing: more green, connected, efficient and sustainable. Topics like Immersive Tech, Smart Cities and Sustainable Infrastructures are part of this topic.

The third volume contains the papers from the ten Special Sessions:

- Applications of Computational Mathematics to Simulation and Data Analysis (ACMaSDA 2023)
- Challenges and the Impact of Communication and Information Technologies on Education (CICITE 2023)
- Workshop on Gamification Application and Technologies (GAT 2023)
- Bridging Knowledge in a Fragmented World (glossaLAB 2023)
- Intelligent Systems for Health and Medical Care (ISHMC 2023)
- Intelligent Systems in Forensic Engineering (ISIFE 2023)
- International Symposium on Technological Innovations for Industry and Society (ISTIIS 2023)
- International Workshop on Electronic and Telecommunications (IWET 2023)
- Innovation in Educational Technology (JIUTE 2023)
- Smart Tourism and Information Systems (SMARTTIS 2023)

ARTIIS 2023 had the support of Universidad a Distancia de Madrid, Madrid, Spain; Universidad Estatal Península de Santa Elena, Ecuador; and the Algoritmi Research Center of Minho University, Portugal. It was realized in a hybrid format: face-to-face and virtual at Universidad a Distancia de Madrid – UDIMA, P.º del Gral. Martínez Campos, 5, 28010 Madrid, Spain – between the 18th and 20th of October 2023. Besides the main conference, ARTIIS 2023 also hosted ten special sessions.

The Program Committee was composed of a multidisciplinary group of more than 457 experts from 60 countries, with the responsibility for evaluating, in a double-blind review process, the submissions received for each of the main themes proposed for the conference and special sessions.

We acknowledge those who contributed to this book: authors, organizing chairs, steering committee, program committee, special sessions chairs, and editors. We sincerely appreciate their involvement and support, which were crucial for the success of

the International Conference on Advanced Research in Technologies, Information, Innovation and Sustainability (ARTIIS 2023). We also wish to thank our publisher, Springer, for agreeing to publish the proceedings.

The success of this third edition gives us a lot of confidence to continue the work. So, we hope to see you in the fourth edition in 2024, which will be in Chile.

We cordially invite you to visit the ARTIIS website https://artiis.org.

September 2023

Teresa Guarda
Filipe Portela
Jose Maria Diaz-Nafria

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| Ronan Guivarch | IRIT-UFTMiP, France |
| Sílvio Gama | Universidade do Porto, Portugal |

### Challenges and the Impact of Communication and Information Technologies on Education (CICITE 2023)

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| Maria Fernanda Augusto | BITrum Research Group, Spain |

### 3rd Workshop on Gamification Application and Technologies (GAT 2023)

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| Mário Pinto | ESMAD, Portugal |
| Filipe Portela | University of Minho, Portugal |

### Bridging Knowledge in a Fragmented World (glossaLAB 2023)

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| Jorge Morato Lara | Universidad a Distancia de Madrid, Spain |
| Sonia Sánchez-Cuadrado | Universidad a Distancia de Madrid, Spain |
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| Héctor Bedón | Universidad a Distancia de Madrid, Spain |
| Isaac Seoane-Pujol | Universidad a Distancia de Madrid, Spain |

**Intelligent Systems for Health and Medical Care (ISHMC 2023)**

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| Bogart Yail Marquez | National Technological Institute of Mexico, Mexico |
| Rosario Baltazar | National Technological Institute of Mexico, Mexico |

**Intelligent Systems in Forensic Engineering (ISIFE 2023)**

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| Samantha Di Loreto | University "G. d'Annunzio" Chieti-Pescara, Italy |
| Sergio Montelpare | University "G. d'Annunzio" Chieti-Pescara, Italy |

**International Symposium on Technological Innovations for Industry and Society (ISTIIS 2023)**

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| Rita Miranda | IOTECH, Portugal |

**International Workshop on Electronic and Telecommunications (IWET 2023)**

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| Carlos Peñafiel | Universidad Nacional del Chimborazo, Ecuador |
| Leticia Vaca | Universidad Técnica Manabí, Ecuador |
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**Innovation in Educational Technology (JIUTE 2023)**

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**Smart Tourism and Information Systems (SMARTTIS 2023)**

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# The Impact of Smart Tourism on Tourist Experiences

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**Abstract.** The tourism industry has witnessed significant growth and transformation in recent years, becoming one of the most dynamic sectors globally. With the increasing number of tourist arrivals, the integration of cutting-edge technologies, including Computer Reservations Systems (CRSs), Global Distribution Systems (GDSs), the Internet, and various contemporary smart technologies, has not only enhanced the convenience and efficiency of travel but has also revolutionized consumer behavior and expectations. Modern travelers demand personalized and tailored experiences that cater to their individual preferences and interests. Understanding the technological effect of so-called smart tourism on the tourist experience is crucial for companies and tourist destinations to remain competitive in the rapidly evolving scenario. This article aims to provide a comprehensive review of the influence of smart tourism technologies on the tourist experience. By synthesizing the latest research, examining industry practices, and analyzing tourist behaviors through surveys, we explore the ways in which technology has reshaped the tourism experience.

**Keywords:** Tourism · Smart tourism technologies · Costumer' journey

## 1 Introduction

Tourism has experienced remarkable growth in recent years, emerging as one of the most dynamic and rapidly evolving industries worldwide. According to the World Tourism Organization (UNWTO), international tourist arrivals reached 1.5 billion in 2019, marking a 4% increase compared to the previous year [1]. This surge in global travel has been fueled by various factors, including rising disposable incomes, improved transportation networks, and the proliferation of digital technologies.

In our modern society, technological innovations have become an integral part of our daily lives, transforming the way we communicate, work, and interact with our environment. From smartphones to artificial intelligence, these advancements have reshaped


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industries across the board, and the tourism sector is no exception [2]. The integration of cutting-edge technologies has had a profound impact on every aspect of the travel experience, from trip planning and booking to on-site exploration and post-trip engagement.

The convergence of Information Technology (IT) and tourism has been ongoing since the 1970s, leading to a transformative impact on tourism products and services. Over the years, tourism has evolved into a sophisticated ecosystem that incorporates various technological advancements, including "Computer Reservations Systems (CRSs) in the 1970s, Global Distribution Systems (GDSs) in the late 1980s, the Internet in the late 1990s" [3], and smart technologies in the 2010s.

The integration of technology in the tourism industry has not only enhanced the convenience and efficiency of travel but also transformed consumer behavior and expectations. Travelers now demand personalized, tailored experiences that cater to their individual preferences and interests [4]. As a result, tourism businesses and destinations must adapt and embrace innovative technologies to remain competitive in the ever-evolving landscape.

This article aims to provide a comprehensive review of the impact of the smart tourism in the tourist's experience. By examining the latest research, industry practices and using surveys to analyze tourist behaviors, we will explore the ways in which technology has reshaped the tourism experience.

## 2 Smart Tourism

Smart Destinations are a particular category of smart cities. It applies the principles of smart cities to urban or rural areas and includes the needs of both locals and visitors [5]. Numerous intelligent tourism endeavors in Europe originated from smart city initiatives, consequently resulting in the emergence of smart tourism destinations in the European tourism industry [5, 6].

The concept of smart tourism encompasses various smart components and layers that are supported by information and communication technologies (ICTs) [7]. The first layer is the smart information layer, which focuses on gathering data. The second is the smart exchange layer, which enables connectivity between different components. Finally, the third layer is the smart processing layer, which handles tasks such as data analysis, visualization, integration, and intelligent utilization [8]. The smart tourism must be able to meet the requirements of "short-term economic needs and long-term sustainable development" [9]. According to the World Tourism Organization, smart tourism has characteristics such as "clean, green, ethical, quality, among others" [10].

Several studies, such as Huang et al. 2017; Lee et al. 2018; No and Kim 2015, suggested a conceptualization of Smart Tourism Technologies (STTs) "attributes that include four key elements, i.e. accessibility, informativeness, interactivity, and personalization. A fifth attribute, security, was put forward" [11].

Accessibility pertains to how easily individuals can obtain and utilize information from various STTs at tourism destinations. High levels of accessibility enhance the ease of use, enabling tourists to access more information and improve their overall travel experience and satisfaction with the destination (Huang et al. 2017; Tussyadiah and Fesenmaier 2007, 2009) [12, 13]. In recent studies, Jeong, M. and Shin, H. demonstrated

that accessibility was not a main factor for tourists to maximize the memorability of their experience [14], only six percent of those interviewed considered accessibility as relevant. This might be due to the present technological setup of smart tourism destinations, specifically because the cities chosen for this research were all advanced smart cities located in the United States and had ample bandwidth capacity.

Informativeness refers to the qualitative effect and sense of reliability of the indications given by STTs about the various choices and places to visit. Studies show that there is a significant correlation between "informativeness and tourists' perceptions of the destination" [15]. In a study on social media, Chung and Koo (2015) found that "the reliability of information is a determining factor of the value of social media in information seeking by tourists" [16].

The interactivity of STTs refers to the reciprocal communication among stakeholders. User participation enables these technologies to provide more applicable and relevant information, which facilitates the efficient search for travel information.

Personalization involves offering customized services that meet tourists' specific needs, maximizing their travel experience and satisfaction with smart tourism destinations. Research shows that personalized services positively influence satisfaction by reducing the time spent on information search [17, 18].

Security pertains to the level of privacy maintained for confidential data during different transactions [19]. Within tourism destinations, the adoption of STTs is influenced by how tourists perceive the protection of their privacy and personal information [20]. If tourists perceive a potential endangerment to the security of their personal information, they will refrain from completing the transaction due to apprehensions regarding privacy and safety [21–23].

Intelligent tourist destinations provide smarter technologies (i.e., artificial intelligence, cloud computing, IoTs, and mobile communication) to collect and distribute information about the place without the tourist being there and offer efficient tourism resources [24].

Many cities already have smart tourism as such technologies can be an integral part of their overall satisfaction with the destination and their revisit intention, examples of smart tourism technologies (STT's) include cloud computing, "ubiquitous computing, Internet of Things (IoT) and connectivity through Wi-Fi, near field communication (NFC), and radio-frequency identification (RFID), sensors, smartphones, beacons, virtual reality (VR), augmented reality (AR), mobile apps, integrated payment methods, smart cards, and social networks sites, etc." [25] (Fig. 1).

Barcelona, for example, offers travelers interactive bus shelters that not only provide information about tourist attractions and bus schedules, but also have USB ports for charging mobile devices. Additionally, the city provides bicycles throughout the city, which can be located via a smartphone app, promoting eco-friendly transportation (http://smartcity.bcn.cat/en/bicing.html). In Hamburg, Germany, an important project is the "Tourismus Suite", which is a mobile app designed to offer tourists real-time information, this app covers a wide range of topics including tourist attractions, events, transportation, dining options, and lodging, and also enables users to customize their

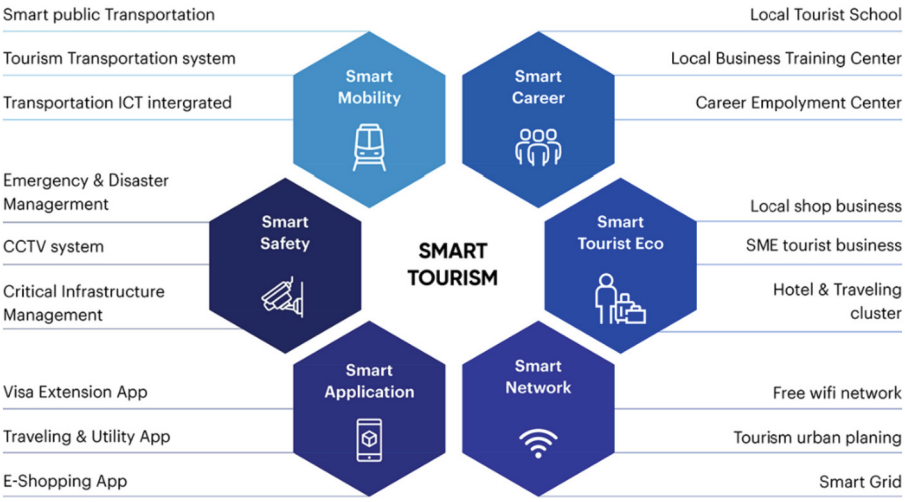


**Fig. 1.** The application of technology platforms in smart tourism development

itineraries and receive alerts about any special deals or promotions. Mexico has implemented an interesting program involving virtual and augmented reality (AR) technologies to enhance the tourism experience, such technologies allows travelers to explore the country's top attractions, for example Mayan ruins and museums, creating immersive experiences from the comfort of their own homes (https://www.visitmexico.com/vr/).

Given the importance of creating an optimal tourist experience and the growing demand for information technology, hospitality and tourism establishments in smart tourism destinations are increasingly collaborating with visitors to provide STTs that can enhance and personalize travel experiences [26]. This trend is aimed at making the travel experience more meaningful and dynamic for tourists.

## 3 Stages of a Smart Tourism

Smart Tourism Technologies serve as technological platforms utilized by tourists throughout every stage of their decision-making process and customer journey [27, 28]. Those technologies have brought about a significant transformation in how tourists strategize, engage with, and reminisce about their trips through the provision of real-time updates and individualized suggestions. These innovative technologies enhance the convenience and pleasure of travel for tourists, offering them a more seamless and delightful experience.

The 'customer journey' framework highlights the significant role played by the visitor/customer. It suggests that the customer's experience is constructed over a prolonged period, beginning before the actual experience and continuing after it, encompassing both pre- and post-purchase stages. As a result, the 'customer journey' can be divided into three distinct steps: These three steps are: a planning phase prior to the trip, where you prospect what will be done; an active tourism experience during the trip itself; and,

finally, a reflective phase after the trip, in which one considers the lived experience. [29–31].

### 3.1 Prospective Phase (Pre-visit)

Before the trip, smart technologies can assist tourists with planning their itineraries, booking travel and accommodations, and exploring their destination [32].

It is worth mentioning that when tourists are in the process of searching, comparing, and planning their trip, they heavily rely on reviews that come from real experiences and recommendations shared by their fellow travelers and social media influencers. This demonstrates the significant level of trust they put in these sources while making their travel-related choices [33, 34]. This is primarily due to the inherent risks associated with purchasing tourism products. A growing number of tourists are now leveraging the collective knowledge shared by fellow travelers on digital platforms, relying on user-generated content (UGC) to gather insights that inform their decision-making process [35]. Such knowledge, sourced from real experiences shared by other tourists on social media, proves invaluable in mitigating decision-making risks [36].

Additionally, there is a group of tourists who actively use advanced technologies to search for and obtain relevant information about tourist attractions. They do this proactively to improve your understanding of these attractions and ensure a rewarding and meaningful visit that enriches your overall travel experience [34, 37].

### 3.2 Active Phase (On Site)

During the trip, smart technologies can enhance the tourist experience by providing real-time information and personalized recommendations. The interaction between humans and computers serves as a clear manifestation of tourists' utilization of smart technologies in tourism endeavors.

Examples of these technologies include Wearable devices that can monitor a tourist's health and activity levels, while location-based services can provide targeted advertising and promotional offers, augmented reality applications can also offer interactive experiences, such as virtual tours and games. These technologies have the potential to enhance and assist tourists in problem-solving, making their visits and journeys more flexible [38, 39]. Additionally, they enable tourists to promptly share their feedback and comments on their experiences in real-time.

### 3.3 Reflective Phase (Post-visit)

After the trip, smart technologies can help tourists preserve their memories and share their experiences with others [40]. Social media is just one example that facilitates the exchange of individual experiences with others via user-generated content (UGC), including comments, images, videos, among others from any device [41], the tourists also use these platforms to portray, reconstruct, and revisit their trips [42]. This process forms a comprehensive chain of opinions that can influence their peers and potential visitors. Wu and Yan's study [43] revealed that documenting and publishing post-trip experiences aids tourists in reinforcing and constructing their own tourism experiences, while also influencing the decision-making behavior of potential tourists.

## 4 Methodology

The main purpose of this study is to understand the impact of smart tourism in tourists' experience. To achieve this objective, a quantitative research approach was employed, utilizing an online survey technique.

The research instrument, a questionnaire, was divided into four sections:

(i) About the Tourist, in this section, questions were designed to gather information about the respondents' profiles, such as nationality, age, gender, marital status, educational background, and monthly income;
(ii) Travel, this sequence of questions aims to comprehend the characteristics of the respondents' trips, i.e. Frequency, presence of companions, primary purpose of travel, and which continents are usually visited;
(iii) The penultimate section is related to the usage of Smart Tourism technologies, where multiple-choice questions were posed to the interviewee, asking them to indicate which Smart Tourism technologies they use during their travel journeys; and
(iv) Feedback, finally, there were questions regarding the tourists' opinions about these technologies, including their usefulness, ease of use, fulfillment of expectations, contribution to a positive travel experience, and influence on their decision to visit or revisit any tourist destinations.

## 5 Results

In total, 53 questionnaires were collected from travelers aged 18 years or older and they were conducted for two weeks. In Table 1 below, a summary of the profile of respondents is presented.

The second part of the research tracks the travel profile of the interviewee. Thus, Table 2 below presents a summary of the respondents' travel profile.

Despite the interviewees being from different continents, the majority travels within the European continent. This can be attributed to various reasons, such as the higher cost of airfare for returning to their home countries, prompting them to stay longer in Europe and explore the region. Additionally, travel between European Union countries tends to be more affordable due to lower expenses for tickets, accommodations, currency similarity, and other factors, thus facilitating such trips.

**Table 1.** Sample profile (n = 53)

| Characteristics | Frequency (n) | Percentage (%) |
|---|---|---|
| Gender | | |
| Male | 36 | 67,9% |
| Female | 17 | 32,1% |
| Age group | | |
| 18 to 24 | 45 | 84,9% |
| 25 to 34 | 5 | 9,4% |
| 35 to 44 | 1 | 1,9% |
| 45 to 54 | 1 | 1,9% |
| 55 to 64 | 1 | 1,9% |
| 65 or more | 0 | 0% |
| Educational level | | |
| High school | 3 | 5,6% |
| Undergraduate student | 48 | 90,6% |
| Postgraduate student | 2 | 3,8% |
| Marital status | | |
| Single | 49 | 92,5% |
| Married | 4 | 7,5% |
| Divorced | 0 | 0% |
| Widowed | 0 | 0% |
| Monthly income | | |
| Under 740€ | 44 | 83% |
| 740 to 1000€ | 5 | 9,4% |
| 1001 to 1500€ | 2 | 3,8% |
| 1501 to 3000€ | 1 | 1% |
| More than 3000€ | 1 | 1% |
| Nationality | | |
| Portuguese | 20 | 38% |
| Brazilian | 23 | 43% |
| Angolan | 2 | 4% |
| Cape Verdean | 6 | 11% |
| Mozambican | 1 | 2% |
| Santomean | 1 | 2% |

**Table 2.** Travel profile (n = 53)

| Questions | Frequency (n) | Percentage (%) |
|---|---|---|
| How often do you travel? | | |
| Once a year | 23 | 43,5% |
| Twice a year | 14 | 26,4% |
| Three times a year | 4 | 7,5% |
| Four or more times a year | 11 | 20,8% |
| Usually travels: | | |
| Alone | 14 | 26,4% |
| Accompanied | 39 | 73,6% |
| On tour | 0 | 0% |
| What is the main reason for these trips? | | |
| Vacation | 34 | 64,2% |
| Visit family or friends | 16 | 30,2% |
| Work | 3 | 5,7% |
| What is the main continent to be visited? | | |
| Europe | 37 | 69,8% |
| Ásia | 1 | 1,9% |
| Oceania | 0 | 0% |
| África | 3 | 5,7% |
| South America | 11 | 20,8% |
| Central America | 0 | 0% |
| North America | 1 | 1,9% |

The third part of the research entails the analysis of whether the respondents employ technologies throughout their journey and, furthermore, which specific technologies they utilize (Table 3).

Using the simple average system (Frequency/Technologies), the smart tourism technologies were utilized an average of 25 times in Prospective phase, 17 times in Active phase, and 16 times in Reflexive phase, indicating a greater usage in the pre-visit.

The final section pertains to the personal opinions of the interviewees regarding the use of these technologies during travels (Table 4).

Despite the most commonly used technologies being in the pre-visit phase, the interviewees found the use of technologies on-site to be more useful, particularly emphasizing the use of online maps. Such technology was utilized by approximately 94% of the respondents.

In general, the STTs received positive feedback in terms of usefulness, expectations, and accessibility, aligning with the previously mentioned first key element of Smart Tourism Technologies.

**Table 3.** Use of STTs (n = 53)

| Questions | Frequency (n) | Percentage (%) |
|---|---|---|
| Is the availability of technologies important in tourist destinations? | | |
| Yes | 51 | 96,2% |
| No | 2 | 3,8% |
| If yes, what technologies do you most use before a trip? | | |
| Social media or travel blogs | 32 | 60,4% |
| Hosting sites | 41 | 77,4% |
| Ticket search sites | 35 | 66% |
| Google maps | 46 | 86,8% |
| Weather forecast | 36 | 67,9% |
| City guide apps | 19 | 35,8% |
| Sites for advance purchase of attraction tickets | 18 | 34% |
| Itinerary planning apps | 19 | 36,4% |
| Augmented reality | 4 | 7,5% |
| Virtual reality | 2 | 3,8% |
| What technologies do you use most while traveling? | | |
| Google maps | 50 | 94,3% |
| Weather forecast | 39 | 73,6% |
| Mobile payment | 31 | 58,5% |
| Parking apps | 5 | 9,4% |
| Touchscreens | 13 | 24,5% |
| Appliance charging stations | 13 | 24,5% |
| Traffic redirection apps | 10 | 18,9% |
| Dynamic kiosks | 4 | 7,5% |
| QRcode | 16 | 30,2% |
| Translate | 17 | 32,1% |
| Augmented reality | 2 | 3,8% |
| Virtual reality | 1 | 1,9% |
| What technologies do you use most after a trip? | | |
| Baggage tracking system | 10 | 19% |
| Feedback system | 16 | 29,8% |
| Photo sharing apps | 42 | 78,7% |
| Virtual reality | 7 | 13% |
| Travel diary apps | 6 | 11% |

**Table 4.** Travelers' Feedback

| Questions | Frequency (n) | Percentage (%) |
|---|---|---|
| Do you find the use of Smart Tourism technologies more useful: | | |
| Before the trip | 12 | 22,6% |
| While travelling | 18 | 34% |
| After the trip | 1 | 1,9% |
| All the previous options | 22 | 41,5% |
| On a scale of 1 (a little) to 5 (a lot), how useful did you find the use of STTs? | | |
| 1 | 0 | 0% |
| 2 | 0 | 0% |
| 3 | 4 | 7,5% |
| 4 | 14 | 26,4% |
| 5 | 35 | 66% |
| On a scale of 1 (a little) to 5 (a lot), did the technologies used during the trip meet your expectations? | | |
| 1 | 0 | 0% |
| 2 | 2 | 3,8% |
| 3 | 7 | 13,2% |
| 4 | 25 | 47,2% |
| 5 | 19 | 35,8% |
| On a scale of 1 (a little) to 5 (a lot), did you have any difficulty using these technologies during your trip? | | |
| 1 | 19 | 35,8% |
| 2 | 10 | 18,9% |
| 3 | 6 | 11,3% |
| 4 | 12 | 22,6% |
| 5 | 6 | 11,3% |
| On a scale of 1 (a little) to 5 (a lot), do you believe that STTs contribute to a better travel experience? | | |
| 1 | 0 | 0% |
| 2 | 2 | 3,8% |
| 3 | 2 | 3,8% |
| 4 | 14 | 26,4% |
| 5 | 35 | 66% |
| Did you feel safer using technology while traveling? | | |

(*continued*)

**Table 4.** (*continued*)

| Questions | Frequency (n) | Percentage (%) |
|---|---|---|
| Yes | 52 | 98,1% |
| No | 1 | 1,9% |
| Would you recommend to other tourists the use of technology while traveling? | | |
| Yes | 52 | 98,1% |
| No | 1 | 1,9% |
| Does the availability of tourism technologies influence you to go and/or return to a tourist destination? | | |
| Yes | 43 | 81,1% |
| No | 10 | 18,9% |

In terms of experience, considering only scales 4 and 5, 92.4% of the interviewees believe that STTs contribute to a better travel experience. Furthermore, 98.1% felt safer utilizing these technologies, and the same percentage would recommend their use. Additionally, 81.1% affirmed that these technologies influence their decision to visit or revisit a tourist destination. These figures highlight the importance of Smart Tourism Technologies for both the tourists' experience and the economic aspects of the tourist destinations themselves. These technologies play a significant role in attracting and retaining customers, as they inspire tourists to visit, recommend, and return to these destinations.

## 6 Conclusions

The main objective of the study was to investigate the influence of smart tourism technologies on tourists' experiences. This research capitalized on existing literature by conceptualizing the dimensions of Smart Tourism Technologies (STTs) and the three phases of the "consumer journey," and developed a comprehensive model of the impact of these technologies on tourist satisfaction and how it influences tourists' consumption behavior after the completion of the visit experience.

The research revealed that the utilization of smart technologies in diverse tourism aspects can have a positive impact on the overall visit experience throughout all three phases. These technologies effectively enhance the attractiveness and memorability of the trip [44]. As observed, there is a positive relationship between satisfaction and intention to revisit.

The development of smart tourism is already underway. It is a natural progression resulting from the widespread use of technology in the tourism industry. However, the organized and widespread coordination, sharing, and utilization of tourist data to create value are still in their early stages. Smart tourism initiatives worldwide aim to establish sustainable smart tourism ecosystems [45]. However, due to the complexity of the sector, it is challenging to go beyond specific innovations related to platforms, technologies,

or services. Nevertheless, the push for technology-driven smart tourism is significant, and it is expected that the tourism industry will play a pioneering role in adopting these intelligent technologies.

As this study is limited, we can identify the number of respondents to the judgment, thus, we propose as future work the application of teaching in a larger universe.

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