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Exploring the Impact of Smart Technologies on the Tourism Industry

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Abstract: The implementation of smart technologies in the tourism industry has become a new trend. This is aimed at enriching tourists' experiences and improving their satisfaction. The purpose of the present paper is to enhance tourists' experiences and to increase tourists' satisfaction using smart technologies and to identify experts' perspectives regarding the use of these technologies. This research was conducted using quantitative and qualitative research. In the process of data collection, the research involved a questionnaire which focused on tourists' experiences with various smart technologies and their intentions to return to the visited region. An exploratory factor analysis was applied to determine the elements of satisfaction and their attribute levels in different Romanian touristic regions. This study employed an analysis of variance to determine whether groups with different reasons for visiting exhibit varying levels of satisfaction and whether the touristic regions under investigation generate differing levels of satisfaction. Cross-tabulation and a Pearson's chi-square test were used to determine whether the tourists' segment influenced their intention to revisit specific regions. The research was augmented using qualitative research based on the Delphi technique to identify experts' opinion on the impact of smart tourism technologies on the Romanian tourism industry. This study presents a global perspective on the current situation of smart technologies in the Romanian tourism sector. The results indicate that there is a significant relationship between tourists' satisfaction and their perception of the value of smart technologies. The use of smart technologies has a positive impact on the experiences of tourists during all phases of their journey. Romania's tourism capabilities can support the development of smart and sustainable tourism. Smart technologies have a double role in the tourism industry. They can enhance satisfaction by introducing new experiences while also improving the operational efficiency and sustainability of tourist destinations. The use of smart solutions will be essential in creating smooth and unforgettable tourist experiences as the industry develops. Their theoretical and practical implications are deduced. This paper provides valuable information not only for organizational practitioners considering the implementation of smart technology solutions, but also for academics wishing to develop this area of study.

Keywords: artificial intelligence; behavioral intention; consumer satisfaction; smart technology; smart tourist

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1. Introduction

Following the Sars-CoV-2 epidemic, the tourism industry has made a significant recovery. According to the World Tourism Organization (UNWTO), the number of international tourists doubled in the first quarter of 2023 compared to the same period in 2022, with an estimated total of 235 million tourists [1]. The forecast for international arrivals is set to reach 95% of the pre-pandemic level by the end of 2023, an 80% improvement [1]. The global inbound spending in the tourism sector is predicted to reach 83% of its 2019 levels, with a full recovery expected by 2024 [2]. According to a report published by the UNWTO, Romania recorded the largest increase in revenue from international tourism in the first quarter of 2023 [1]. The involvement of artificial intelligence (AI) in this industry could

lead to an increase in total revenue of 7% to 11.6% [3]. There are various modern applications that can contribute to this growth, such as customer satisfaction, smart tourism, service recovery, brand/destination image, big data, e-tourism, sustainable experiences, and Artificial Neural Network (ANN) applications [4].

The available research suggests that smart tourism technologies (STTs) are associated with touristic experiences [5–7] as an important conditioning element generating the satisfaction grade of tourists [8]. Few studies have analyzed the correlation between the elements of smart tourism technologies (STTs) and tourists' experiences and behavior [9–12]. This represents a knowledge chasm that the present study aims to discuss. This study analyses tourists' perspectives and is based on technology-enhanced experiences, offering better knowledge of the current context and the application of modern smart technologies by examining their attributes. The purpose of this paper is to enhance the touristic experience and to increase tourists' satisfaction. Also, this study investigates the experts' opinions regarding smart technologies in the tourism sector.

The proposed goal was considered achievable through the following objectives: to identify the attribute levels of the satisfaction elements of Romania's touristic regions; to analyze whether segments with different reasons for visiting have various levels of satisfaction; to identify whether the researched touristic regions report distinct levels of satisfaction; to decide whether the smart tourist segment influences tourists' intention to returned to the analyzed regions; to indicate advantages and disadvantages of utilizing smart tourism technologies from the experts' perspectives; and to indicate the current usage of smart equipment in the tourism sector from the experts' point of view. Our research hypotheses are as follows:

H1: *There is a significant positive correlation between the smart tourists' expectations and their satisfaction.*

H2: *There is a significant positive correlation between smart touristic regions and tourists' satisfaction.*

This research was conducted using quantitative research methods. In the process of data collection, the research used a questionnaire in which subjects were asked about the use of different smart technologies in their touristic experience; their satisfaction regarding the use of artificial intelligence, the Internet of Things, and virtual and augmented reality; their intention to return to the visited region; and their demographic characteristics. An exploratory factor analysis was applied to determine the elements of satisfaction and their attribute levels in Romanian touristic regions. This study employed an analysis of variance to determine whether segments with different reasons for visiting exhibit varying levels of satisfaction, and if the touristic regions under investigation demonstrate differing levels of satisfaction. Cross-tabulation and Pearson's chi-square test were used to determine whether the tourists' segment influenced their intention to revisit specific regions. This study presents a global perspective on the current situation of smart technologies in the Romanian tourism sector. The research was augmented with qualitative research based on the Delphi technique to identify experts' opinions on the impact of smart tourism technologies on the Romanian tourism industry.

Firstly, the present study helps to understand tourists' perceptions of specific attributes in the context of smart technologies and sustainability, which can enrich current research theory by offering a reference for researchers, practitioners, and organizational decision-makers. Secondly, the research provides a clearer understanding of the connections between STTs' characteristics, satisfaction, and tourists' behavioral attitudes. Thirdly, the relationships between smart tourists' profiles, satisfactions, and revisit intentions will aid the decision-making process of specialized organizational decision-makers (e.g., to adjust services, to develop new devices, to improve competitiveness, etc.). Fourthly, the experts' perspective will be analyzed.

According to the authors' knowledge, this paper offers the first complex research on this topic in the context of Romanian tourism. It examines smart tourist technologies in

relation to tourists' experiences and satisfaction and offers a high-level expert perspective regarding the use of these technologies. The findings of this research could be used in an international context to improve the development of smart sustainable tourism. This paper adds value to the research field through its combination of three attribute-level satisfaction factors in the context of tourists' experiences with smart technologies, as well as its unique research methodology.

The paper is structured as follows: there are introduction, literature review, methodology, results, discussion, and conclusion sections.

2. Literature Review

2.1. Modern Technologies

The evolution of innovative solutions to facilitate the industry's transition to Tourism 4.0. needs careful consideration [13]. The 4.0 technologies' capabilities can enhance interactions with a specific system and enrich the tourist experience, providing new opportunities to support behavioral change and, in time, to transform users [13]. The human-centered perspective represents a solution to ground the fast and impactful development of Tourism 4.0. The place of the human-centered perspective in Tourism 4.0 relates to enhancing the complex technology-mediated tourism experiences occurring within the broader tourism ecosystem [13]. Artificial intelligence (AI), big data, machine learning, the Internet of Things (IoT), augmented reality (AR), virtual reality (VR), cloud computing, radio frequency identification devices (RFIDs), mobile payments, tourism-related platforms, and all types of smart technologies are being studied more carefully in the tourism industry. AI models have had success in this sector [14]. The big data in tourism are generated by the environment as well as by tourists. The environment is the determinant of climatic data, the information about situations occurring at the destination, and real-time information from sensors, the IoT, and transactions [15–17]. Tourists generate data, such as biometric and emotional data and user-generated content, through various means including online and offline activities [17]. Tourists search and then book services online, making tracking their digital footprint very easy [18]. Tourists leave offline traces of their consumption, movements, and bookings, which are reproduced by various instruments such as mobile roaming, GPS, and Bluetooth tools like PoS. Biometric and emotional data can also be collected through thermal images and face recognition [17]. AI can contribute to generating business opportunities, income, and trends in demand [19].

One significant trend in tourism is personalization, which involves tourists managing their own itineraries [20]. The problem of designing tourist trips involves the creation of personalized itineraries [20]. AI systems in the tourism industry refer to personalization and recommender systems; translation applications and devices; conversational systems; and forecasting, language, and integrated systems such as robots and smart travel assistants. These assistants are applications that know the tourist (i.e., his/her preferences, wishes, interests, etc.) and offer on-demand suggestions, anticipating the tourist's needs [18]. Personalization techniques provide tourists with customized information based on their requirements and limitations [21]. Recommender systems are instruments that offer tourists options that best fit their curiosities [22]. Tourism Recommendation Systems (TRSs) provide tourists with suggestions about the most appropriate means of transport (air, rail, etc.), accommodation, museums, points of interest, and other items needed for their trip [23]. Scientists [24–26] have highlighted the power of smart robotics and the application of AI in this industry, with clear use cases such as the use of robots as waiters, bartenders, and front desk personnel. The implementation of personalized recommendations includes the involvement of cloud robotics and robotic navigation [26]. After the Sars-CoV-2 pandemic, robotic contactless services have become important [27]. AI chatbots and virtual assistants, such as multilingual robots, are utilized to answer customers' questions [26]. Multilingual virtual personal assistants improve customers' experiences [28]. Customer relationship management (CRM), which is based on big data, helps chatbots provide customized travel services [19].

AI is essential in augmenting customer experiences and generating customer pleasure, loyalty, and recommendations [29,30]. Big data from user-generated content are important for studying tourists' attitudes, perception, and curiosity [31–33]. Modern tools can contribute to the consumer experience through stress management and emotional intelligence [33]. Modern technologies help organizations to target consumers with individualized marketing messages [34]. They are used in smart tourism systems to help tourists in the decision-making process, offering digital and intelligent services to tourists who wish to organize their itineraries flexibly and improving the economic and tourist development of a given area (e.g., SMARTCAL, a system based on the consideration of Points and Events of Interest and how they relate to transport systems, the hospitality sector, and policy makers) [35]. Guest preferences can be remembered using IoT platforms, which improves consumers' experiences [36,37]. The use of VR extends the service experience for tourists [30]. AI can provide a good travel experience through augmented reality [38]. Travelers' co-creation in this experience will have an important role in generating the advancement of tourism service transmissions [27].

Scholars argue [32,37,39] that modern technology can optimize the allocation of resources, improve the management of waste, contribute to energy consumption, reduce the industry's ecological footprint, improve health measures, generate corporate social responsibility, and promote sustainable tourism. The evolution of smart modern technologies anticipates the destruction of cultural heritage sites [29,40].

Modern smart technologies have positive effects on the tourism industry: they allocate room resources according to guests' preferences, adapt the available cuisine to the tastes of existing tourists, facilitate the use of robots in the reception area, help tourists with access to their digital services, navigate unknown environments, and so on. However, there are some issues regarding the admission and the adoption of these technologies by tourists. The greater issues with modern technologies are tourists' perceptions and attitudes towards them.

2.2. Smart Tourists' Profile

In recent years, tourists have become more experienced. They have found new ways to search for information, to analyze, to book, to share, to complain, to review, and to recommend [41]. The significance of these changes has transformed the classical tourist into a smart tourist [42,43]. The development of the IoT, big data, VR, AR, AI, and ubiquitous connectedness require a framework designed for the better knowledge of the tourist in this context [41].

A smart tourist is a tourist who, by giving his data and using smart technologies, connects flexibly with various stakeholders to create a personalized, smart experience [41]. According to the relevant literature, scholars have identified the following as key factors: privacy and security policies regarding data sharing [5,44–51], the adoption and use of smart technologies [42,44–53], and the perception of interaction and co-creation with partners through these technologies [5,46,48,53–57]. Moreover, a smart tourist is ready to share with other smart stakeholders if he feels safe and if he feels that his personal data, preferences, expenditures, social media profiles' information, location, etc., are also safe. An example of this is the use of suggested and personalized systems for travel planning [41]. The use of smart technologies are increasingly preferred by tourists to perform real-time networking and co-creation with other partners in museums, to check-in via a mobile device in different locations, to order room service, and to connect their smartphones to room media for personal entertainment. To generate a co-creation process, tourists should trust stakeholders, feel in control of the experience through using smart technologies according to their preferences, and empower other agents to generate added value [41,52].

2.3. Relationships between Variables

2.3.1. A Smart Tourist's Expectations and His/Her Satisfaction

At present, tourists' expectation levels are very important due to the dynamic needs of the different groups and to the dynamic market environment. Expectations generate performance perceptions of products, services, and experiences [58]. On one hand, many studies claim that consumers' experiences positively influence their expectations of future experiences [59–67]. This expectation–satisfaction relationship examines the role of expectations in consumers' satisfaction judgments [59]. On the other hand, studies show that the nature of the relationship between expectations and satisfaction may depend on various contextual and behavioral elements [59,61–63,68]. Furthermore, users' expectations have various effects on the creation of satisfaction in each context [59]. Smart tourists have initial beliefs about a service before they consume it, based on information from advertisements and the experiences of other consumers [69]. Expectations are formed based on past experiences, including a tourist's satisfaction with the service, the service provider's communication, and the tourist's perception of the service [12,70]. Tourist expectations influence perceived value and satisfaction [14,15,58,71]. Expectations of the destination region may form the basis of the evaluation of the money paid and the value of the service provided [70]. In this context, hypothesis 1 is constructed.

2.3.2. Smart Tourism Regions and Tourists' Satisfaction

A smart tourism region identifies its strengths and opportunities and coordinates its available resources to achieve maximum productivity in the region. It should aim to make the most of its resources [72,73]. Smart tourism regions should embody what a smart regional tourism experience requires. Using new technologies at a regional level could greatly improve tourism. Improvements in the use of information and communication technology (ICT) reveal the management of regions and destinations as ecosystems. [5,47,49,54,55,74]. The integration of stakeholders' inputs into the ecosystem signifies the designing of the right experiences [41]. A smart tourism region, such as a smart destination, offers a satisfying tourist experience based on co-creation, knowledge sharing, and permissive "infostructure" [73]. The use of smart tourism technologies is an important element in creating destination loyalty and increasing tourist satisfaction [75]. The use of smart technologies in touristic destinations can also be an element that gains them a competitive advantage and be a key element in all destinations' administrative activities. In a smart tourism region, "tourism applications, decision support systems, ambient intelligence, VR and AR systems, mobile applications, mobile-connected devices, integrated payment methods, intelligent cards, cloud computing" are used [75,76]. Even though there are positive effects of STT elements on the overall satisfaction of tourists [51,74], smart technologies could lose or destroy tourism services' value [77]. Accessibility, informativeness, interactivity, and personalization represent the key elements to generating a positive experience [75]. Experiences are completed by the perception of the tourists' context, personalization, real-time monitoring, and their utilization of specific smart technologies [47,78]. The smart experience element involves the technology experiences of tourists and generates data that may raise the quality of their experiences [79]. Tourists should be co-creators of their experiences. Hence, hypothesis 2 is formulated.

2.3.3. Satisfaction and Behavioral Intention

Behavioral intention pertains to the inclination of a tourist to revisit and recommend a destination [80]. Several scholars have studied the results of tourists' experiences and analyzed possible relationships between experience and value [56], behavioral intention [81], revisiting, and the satisfaction of tourists [11,81,82]. Smart tourists' behaviors and corelated attitudes have a role in the creation of smart experiences [41]. The importance of emotions in tourists' behavioral patterns has increased [82].

According to Van Dolen et al. [83], satisfaction is influenced by both cognitive systems and emotional states. The behavior of tourists at different stages of smartness reveals their

trust and control issues and constraints, such as a reluctance to share private data and use smart technologies [76]. Tourism studies consider satisfaction to be the most important variable because it enables tourists to have positive post-visit behavioral attitudes towards revisiting and recommending a destination [84].

3. Materials and Methods

The aim of this research is to analyze the factors that determine satisfaction at the attribute level in the experience services provided by Romania's touristic regions through the application of smart modern technologies (see Figure 1).

Figure 1. Map of Romania. Source: [85].

This study presents Romania as an example of a medium-sized developing country, and member of the European Union (EU), which represents a market opportunity because it occupies the 8th position in the EU27 by size and the 6th position in the EU27 by population. The country is a pool of stability. Romania is the largest country in Southeast Europe and the second largest in Central and Eastern Europe. In 2023, the tourism sector of the country was projected to contribute 4.19% to the country's GDP. The number of arrivals to tourism accommodation has been consistently increasing by approximately one million every year, from 2015 to 2020. The COVID-19 pandemic in 2020 influenced the number of tourist arrivals, which decreased considerably (50%) compared to the preceding year, reaching 6.35 million people. This research was conducted through a survey of tourists in Romania's historical touristic regions, including Transylvania, Banat and Crișana, Bucovina and Moldova, Dobrogea, Maramureș, and Walachia and Oltenia [85].

Transylvania is representative of some of Europe's best-conserved medieval towns and remarkable rural landscapes. The most popular destinations are Brasov, where the largest Gothic church in Eastern Europe is found; Sibiu, with Transylvanian Baroque architecture; and Sighisoara, with a citadel on the hill with secret passageways and a clock tower dating from the 14th century. Near Brasov there are many fortified Saxon churches and Bran Castle. Transylvania has multi-ethnic heritage (Romanian, German, Hungarian, and Szekely) demonstrated by its folk costumes, architecture, cuisine, music, and traditions. Viscri is a special place that continues to promote sustainable development through various projects sustained by Prince Charles of the United Kingdom. For mountain

lovers, the Apuseni Mountains offer more than 4000 caves and rare species of wildlife and wonderful landscapes [85].

The provinces of Crisana and Banat benefit from a unique mix of architectural and cultural history. The principal cities in western Romania, Timișoara, Oradea, and Arad, offer visitors an insight into Banat and Crișana's long history and interesting traditions [85].

In Iași, the cultural capital of Moldova, history and religious life have come together over the last half of the past millennium. Bucovina is home to a Byzantine art treasure, the "Painted Monasteries"—a UNESCO World heritage site. Ceahlău National Park, home to 90 species of birds, offers a unique mountain experience, as does Bicaz Gorge, a steep, winding climb of more than three miles [85].

Dobrogea is home to the Danube Delta, a 2,200-square-kilometer nature reserve designated a "Biosphere Reserve" by UNESCO; the port city of Tulcea; the port city of Constanta; and the seaside resorts along Romania's Black Sea coast [85].

The Maramureș region is known for its villages, where centuries-old heritage is part of everyday life (unique wooden churches with high spires and shingle roofs, wooden houses with high, carved wooden gates, hand-woven carpets, etc.) [85].

Walachia's unique mix of historical and natural attractions include the heritage buildings and museums in Bucharest—Romania's capital city—royal palaces, ancient monasteries, and Carpathian Mountain experiences, as well as sculptor Constantin Brâncuși's works [85].

3.1. Research Objectives and Hypotheses

Quantitative marketing research and qualitative research were carried out to achieve our proposed objective.

Research objectives

The following objectives were considered to be appropriate for the achievement of our larger proposed objective:

O1—to identify the attribute-level satisfaction elements of Romania's touristic regions.
O2—to analyze whether segments with different returning reasons have different degrees of satisfaction.
O3—to identify whether our selected tourism regions reported distinct degrees of satisfaction.
O4—to decide whether the smart tourist segment influences tourists' intention to return to the analyzed regions.
O5—to indicate the advantages and disadvantages of utilizing smart tourism technologies, from the experts' perspective.
O6—to indicate the current usage of smart technology in the tourism sector from the experts' point of view.

3.2. Research Design and Data Collection

This research focuses on a survey given to the tourists in Romania's historical touristic regions. During the data collection stage, the research used a questionnaire in which subjects were asked about their usage of different smart technologies in their tourism experience; their satisfaction regarding the use of AI, IoT, VR and AR; their plan to return to the destination; and their demographic characteristics.

In this paper, previously validated scales are used, with necessary modifications being made to each of the question items to suit the context of the current study. Satisfaction with Romanian touristic regions and their smart technologies was analyzed using 14 items measured on a 5-point Likert scale, with equal distances between neighboring levels, where 1 is very dissatisfied and 5 is very satisfied. The following elements were acquired from previous studies [9] and adapted to the specificities of the subject analyzed: the ability to communicate easily with the services of intelligent chatbots; using robotic process automation (RPA) in revenue accounting; using AI in lodging services; using tablets to replace printed menus in restaurants; digital keys that use a smartphone application; using intelligent voice assistants' services for easy communication; using AI in the car parking systems at accommodation/restaurants; using geolocation/GPS, Bluetooth, and beacon

technology; using smart rooms; using virtual reality headsets; using virtual reality glasses; using Google cardboard; using Augmented Reality Apps; and using social media platforms.

Nominal and binary scales were used to gather information about the subjects' demographic characteristics and their intention to revisit the regions [11]. These questions referred to the subjects' demographic and travel characteristics such as their age, monthly income, education, occupation, country of residence, the purpose of their visit, and the prevalence of their visits to the destination region. In order to ensure adequate reliability, a pilot test on a sample of seventeen respondents was conducted in order to identify possible issues with the questionnaire.

The questionnaire was administered individually at different locations within the analyzed touristic regions (e.g., cultural institutes, accommodation units, info travel points, etc.). Participants were assured of the confidentiality of their responses within the research. The research was conducted by volunteer operators. The interviews were conducted from June to September 2023. The final sample includes 1246 respondents.

The research was augmented with qualitative research based on the Delphi technique. The Delphi method is applied by scholars in the process of transitioning towards sustainable tourism [86]. The Delphi method is widely regarded as effective in researching dynamic environments, providing better forecasting [87]. Hence, the Delphi technique is an essential instrument to employ in researching the tourism industry, which deals with various dynamic factors. Data were collected from a group of experts from the Romanian tourism sector. A panel of experts was chosen to determine the level of importance of the items with an impact on smart tourism technologies' development, by means of rating their importance on a five-level scale from least to most important. The sample group consisted of eighteen high-level specialists in the tourism industry, who were contacted by e-mail. The Delphi method typically involves an expert group consisting of 15 to 20 individuals [88,89]. The researchers invited all these managers to participate in the research. Eighteen managers from eighteen tourism organizations agreed to participate. The sample is composed of eight hotel managers, three travel agency managers, three Tourism Ministry representatives, two restaurant managers, and two cultural organization managers. In the present research, the Delphi method was used to collect data from experts working in the tourism industry in Romania. After confirming their participation and assuring them of the confidentiality of their responses within the research, questionnaires were offered to the participants. In the initial round of data collection, eighteen respondents answered the questionnaires.

3.3. Data Processing

The data obtained from the quantitative research were analyzed, using various statistical methods, in the IBM SPSS Statistics 25.0 software. The data were checked for errors to ensure unbiased results. Five items with a significant number of missing values were excluded from the analysis. An imputation analysis was used to analyze cases with randomly missing values in the SPSS Statistics 25.0 software. The missing values were replaced with mean values. The effect of outliers was minimal as the Likert scale used had five levels. No outlier treatment was employed.

An exploratory factor analysis (EFA) was applied to achieve objective 1, which was to identify the satisfaction elements of Romania's touristic regions at the attribute level. The aim of the analysis was to reduce the number of satisfaction-related items to a small number of uncorrelated elements that convey the same information [90,91]. This analysis resulted in three factors representing attribute-level satisfaction elements. These factors were selected after eliminating from the analysis the items which contained missing cases. The EFA was conducted based on nine items: the ability to communicate easily with the services of intelligent chatbots; using AI in car parking systems at accommodation/restaurants; using robotic process automation (RPA) in revenue accounting; digital keys that use a smartphone application; using geolocation, Bluetooth, and beacon technology; using smart places; using virtual reality glasses; using virtual reality headsets; and using Google cardboard.

The consistency of the construct was confirmed by its Cronbach's alpha coefficient, which had a value of 0.68 [87]. The data eligibility of the varimax rotation analysis method was analyzed by generating a Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The extraction method involved a principal component analysis (PCA) [11].

This study employed an analysis of variance (ANOVA) to determine whether groups with different returning reasons had different levels of satisfaction. The ANOVA was also used to identify the influence of the independent variables on the dependent variable [11]. Additionally, the ANOVA was used to determine whether the analyzed touristic regions reported distinct levels of satisfaction (O3).

Pearson's chi-square test was used to decide whether the segment of smart tourists influenced tourists' intention to return to the analyzed regions (O4) through cross-tabulation.

The Delphi technique was used in this research. The research employed guidelines from various studies [92–94] to forecast tourism trends. A panel of experts was chosen to indicate the level of importance of items with an impact on smart tourism technologies' development. More precisely, they were asked to point out the advantages and disadvantages of utilizing smart tourism technologies from the experts' point of view (O5) and to indicate the current usage of smart technology in the tourism sector from the specialists' view (O6). The items are as follows:

1. Smart tourism technologies improve tourists' experiences throughout all the phases of their journey.
2. Intelligent technologies improve tourists' feedback and service times to reduce resolution time issues.
3. Intelligent technology could complete routine tasks faster.
4. Intelligent applications—robotic process automation (RPA)—improve business processes.
5. Human employees may perceive this technology as a threat.
6. Chatbots and robots can recognize specific keywords and provide corresponding answers from a predetermined set of answers.
7. Smart tourism applications lack an individualized approach.
8. Smart technologies improve advertising.
9. Smart software systems help with operational analytic processes.
10. Receptions can be managed by robots that are proficient in multiple languages.
11. AI, VR, and IoT are used in personalized services for tourists.
12. AI is utilized in lodging services.
13. Tablets are used to replace printed menus in restaurants.
14. AI is used in car parking systems at accommodation/restaurants.
15. Check-in based on facial recognition is used to enable tourists to bypass queues during the registration process.
16. Tourists can control all accommodation/restaurant functions using their personal mobile devices.
17. VR permits tourists to experience a service as if they were physically present, even before deciding whether to book.
18. AI-empowered content solutions are utilized to create customized destination guides based on tourists' travel information.
19. Digital keys are used through smartphone applications.
20. Tourism services use automation technologies.
21. Room service robots deliver food, beverages, and additional towels to tourists.

These research points comprised twenty-one items that were used to gather data from a sample group of experts in the tourism sector.

4. Results

4.1. Demographic Characteristics

Most of the respondents to our quantitative research were working people (79.7%) with an average income (41.4%) and higher-level education (68.3%), aged between 30 and 50 years old (46.6%).

The research results were generated using the variables "Tourist segments according to the return reason" and "Romanian Region", as presented in Table 1, to achieve our research objectives.

Table 1. Sample characteristics.

Characteristics	% of Total Sample
Age	
<18 years	2.2%
18–29 years	28.4%
30–50 years	46.6%
51–65 years	20.7%
>65 years	2.1%
Monthly income	
<EUR 250	28.7%
EUR 251–650	41.4%
>EUR 651	29.9%
Education	
Lower education	2.4%
Upper education	29.3%
Higher education	68.3%
Occupation	
Working	79.7%
Retired	20.3%
Country	
Romania	58.8%
Different countries	41.2%
Tourist types	
Workcations *	10.7%
Culture tourists	37%
Leisure tourists	30.5%
Nature tourists	12.0%
Eclectic tourists	9.8%
Romanian Region	
Transylvania	21.4%
Banat and Crișana	11.6%
Bucovina and Moldova	28.6%
Dobrogea	14.5%
Maramureș	13.5%
Walachia and Oltenia	10.4%

* Source: [95].

The characteristics of the participants in the qualitative research are presented below.

Regarding the interview participants (see Table 2), eleven of them were male and seven were female, and all of them lived in different urban areas and had expertise in the tourism sector. More precisely, two hotels were from the Transylvania region, two hotels were from the Bucovina and Moldova region, and the final four hotels were from Banat and Crișana, Dobrogea, Maramureș, Walachia and Oltenia, one from each region. Two travel agencies were from Walachia and Oltenia and one was from the Transylvania region.

The cultural organizations and restaurants were from different cities in the Transylvania region. They were selected due to their organizations' performance over the last five years (the number of tourists accommodated; the tourist packages sold; the number of entries to cultural institutions, etc.).

Table 2. Experts' characteristics.

Type	Respondent	Work Position	Work Experience Years
Hotel	Hotel 1	Sales Manager	14
	Hotel 2	General Manager	23
	Hotel 3	Human Resource Manager	7
	Hotel 4	General Manager	11
	Hotel 5	Marketing Manager	5
	Hotel 6	Sales and Marketing Manager	17
	Hotel 7	General Manager	19
	Hotel 8	Sales Manager	13
Travel Agencies	Travel agency 1	General Manager	16
	Travel agency 2	Sales Manager	15
	Travel agency 3	General Manager	11
Tourism Ministry	Representative 1	Tourism specialist	24
	Representative 2	Manager	10
	Representative 3	Tourism specialist	7
Cultural Organizations	Representative 1	General Manager	19
	Representative 2	Marketing Manager	13
Restaurants	Restaurant 1	General Manager	11
	Restaurant 2	Sales Manager	8

4.2. Expectation–Satisfaction Elements

Table 3 presents the means for every satisfaction item in the quantitative research. All items scored above 3 points (neutral level) on the 5-level scale. The minimum score for each item is 1 point, and the maximum is 5 points [11].

Table 3. Means of satisfaction elements.

Satisfaction Items	Mean
Communicate easily with the services of intelligent chatbots	3.2737
Using robotic process automation (RPA) in revenue accounting	4.0903
Using AI in lodging services	3.1124
Using tablets to replace printed menus in restaurants	3.1290
Digital keys that use a smartphone application	4.9212
Using intelligent voice assistants' services for easy communication	4.3012
Using AI in car parking systems at accommodation/restaurants	4.8042
Using geolocation/GPS, Bluetooth, and	3.8965
beacon technology	3.9023
Using smart room	3.1734
Using virtual reality headsets	3.3076
Using virtual reality glasses	3.8760
Using Google cardboard	3.0900
Using Augmented Reality Apps	3.1490
Using social media platforms	4.2907

The highest means were obtained by the following items: "Digital key using a smartphone application", followed by "Using AI in car parking system at the accommodation/restaurants", and "Using intelligent voice assistants' services for easy communication". The lowest means were recorded for "Using Google cardboard", "Using AI in lodging services", and "Using tablets to replace printed menus in restaurants".

An exploratory factor analysis was conducted to identify the satisfaction elements of Romania's tourism regions (O1) at the attribute level. The extraction method used was a principal component analysis with varimax rotation. Nine satisfaction items were used, and a three-factor solution was analyzed after excluding items with unrelated responses. The analysis revealed that three factors had eigenvalues greater than or equal to 1, explaining 63.69% of the total variance (Table 4).

Table 4. EFA results.

Items	Factor 1	Factor 2	Factor 3
Communicate easily with the services of intelligent chatbots	0.684		
Using AI in car parking systems at accommodation/restaurants	0.852		
Using robotic process automation in revenue accounting	0.716		
Digital keys that use a smartphone application	0.638		
Using geolocation/GPS, Bluetooth, and beacon technology		0.698	
Using smart rooms		0.624	
Using virtual reality glasses			0.590
Using virtual reality headsets			0.670
Using Google cardboard			0.636
Eigenvalues	2.89	1.32	1.85
Percent of variance explained	32.14%	13.29%	18.22%

This extraction method is considered acceptable as the Kaiser–Meyer–Olkin (KMO) value is 0.658, which is greater than the minimum threshold of 0.5. Additionally, Bartlett's Test of Sphericity returned a chi-square value of 298.69, with a significance level of less than 0.01.

The resulting factors were labeled as follows, based on the classical context of the items that were ascribed to them: Factor 1—"AI technologies", Factor 2—"IoT technologies", and Factor 3—"VR technologies". The means that conferred the importance of a factor for the respondents were calculated in SPSS to analyze new variables. The analysis of the response frequencies for each attribute-level satisfaction element showed that a high percentage of tourists were satisfied, with scores equal to or greater than 4 points on a 5-level scale. These factors include AI technologies (82.8%), IoT technologies (76.7%), and VR technologies (54.2%).

4.3. Relationships between Segments of Tourists and Their Satisfaction

To achieve the second objective (O2), which is to analyze whether segments with different reasons for returning have varying degrees of satisfaction, we analyzed attribute-level satisfaction elements in correlation with the tourists' segments, based on their visit reasons. Table 5 presents the satisfaction ratings for three technology factors: AI, IoT, and VR. Factor 1, AI technologies, received the highest general mean satisfaction with 4.70 points. Factor 2, IoT technologies, received a rating of 4.30 points. Factor 3, VR technologies, received the lowest satisfaction rating of 3.58 points.

Table 5. Results according to travel reason.

Segments of Tourists	Attribute-Level Satisfaction Factors		
	AI Technologies	IoT Technologies	VR Technologies
	Mean	Mean	Mean
Workcations	4.89	4.06	3.10
Cultural tourists	4.37	4.13	4.79
Leisure tourists	4.78	4.36	3.18
Nature tourists	4.81	4.89	3.04
Eclectic tourists	4.67	4.10	3.80
General mean	4.70	4.30	3.58
ANOVA F	12.698	5.475	0.923
Sig.	0.000	0.001	0.325

The means' distribution across the five tourist segments indicates that segments with different return intentions felt varying degrees of satisfaction. The ANOVA results showed significant differences in the five segments for the two satisfaction attributes "AI technologies" and "IoT technologies" (Sig < 0.01).

Of the five tourist segments, workcations, leisure, and eclectic visitors reported the highest degrees of satisfaction with "AI technologies" (mean = 4.89, 4.78, 4.67 points, respectively). Cultural visitors reported the highest level of satisfaction with "VR technologies" (mean = 4.79 points), while nature travelers had the greatest mean scores for the "IoT technologies" factor (mean = 4.89 points).

4.4. Romanian Destinations and their Relationship with the Degree of Satisfaction

Research objective 3 (O3) aimed to determine whether the touristic regions generated varying levels of satisfaction. Table 6 presents the mean satisfaction levels for each attribute in correlation with the studied touristic destinations.

Table 6. Relationships between satisfaction elements and touristic regions. Attribute-level satisfaction factors.

Destination Region	AI Technologies	IoT Technologies	VR Technologies
	Mean	Mean	Mean
Transylvania	4.80	4.67	3.17
Banat and Crișana	3.31	4.71	3.05
Bucovina and Moldova	3.14	3.92	4.02
Dobrogea	3.20	4.10	3.02
Maramureș	3.26	3.88	3.15
Walachia and Oltenia	3.01	4.07	4.09
General mean	3.45	4.22	3.41
ANOVA F	12.136	22.789	12.070
Sig.	0.000	0.000	0.000

Transylvania was rated the highest for "AI technologies" (mean = 4.80 points), while Banat, Crișana, Dobrogea, and Maramureș received the highest ratings for "IoT technologies" (mean = 4.71, 4.10, 3.88 points, respectively). Bucovina, Moldova, Walachia, and Oltenia received the highest ratings for "VR technologies" (mean = 4.02, 4.09 points, respectively). The ANOVA results (from Table 5) showed significant differences between the satisfaction factors at the attribute level for all tourism regions analyzed (Sig < 0.01).

4.5. Segments of Tourists and their Return Intention

Regarding the fourth research objective (O4), "to decide if the smart tourist segment influences the intention to return to the analyzed regions", the cross-tabulation results show that a large percentage of tourists intend to return to their destination (please refer to Table 7).

Table 7. Segments of tourists and their return intention.

Return Desire	Workcations	Cultural Tourists	Leisure Tourists	Nature Tourists	Eclectic Tourists	Pearson Chi-Square	Sig.
Yes	81.8%	69.4%	75.7%	80.8%	68.4%	46.83	0.00
No	18.2%	30.6%	24.3%	19.2%	31.6%		

This study revealed variations among tourist segments in terms of their propensity to revisit a destination. Workcation tourists had the highest percentage of return intentions, while eclectic tourists had the lowest. These results may be explained by the differences in the profiles of the segments.

In conclusion, there is a correlation between tourists' profiles and their intention to return to their destinations. The Chi-square test results (Pearson Chi-square value = 46.83, $p < 0.01$) indicate a statistically significant relationship between the two variables.

Regarding the hypotheses of this research, the results suggest that there is a significant positive correlation between smart tourists' expectations and their satisfaction, with the values $\beta = 0.168$, t-value = 3.361, and $p < 0.001$ (H1). Also, there is a significant positive correlation between smart tourism regions and tourists' satisfaction, with the following values: $\beta = 0.196$, t-value = 5.103, and $p < 0.001$ (H2). To conclude, both of the following hypotheses of this research are confirmed.

4.6. Implementation of the Delphi Technique

Our questionnaire asked the respondents to rate the importance level of twenty items that may influence smart tourism technologies (O5 and O6). Respondents rated the items from 1 to 5, indicating their level of importance from least to most important. To explicate the rating data, consider the range of scores and their corresponding levels of importance as given in Table 8.

Table 8. Range of scores and their level of importance.

Range	Level
1.00–1.80	unimportant
1.81–2.60	of little importance
2.61–3.40	moderately important
3.41–4.20	important
4.21–5.00	very important

Descriptive statistics (percentage, mode, and mean) were generated for the first-round data. The results were tabulated and returned to the experts for the second round. In the second round, the eighteen participants were able to see the mean scores of all the experts' ratings. They then reviewed each activity and rated each item again on a scale of 1 to 5 based on their level of importance. At the end of the second round of data collection, a consensus had been reached.

The mean scores for each item of Romania's smart tourism were computed by analyzing the data collected from the sample group of eighteen respondents over the two rounds.

The order of the 10 items remained the same in second round of the Romanian smart tourism forecast as that obtained from the participants in the first round (Table 9). However, the rankings of the second most important item differed. The most important advantage of using smart technologies, in the experts' opinion, is that these technology applications improve the tourists' experience throughout all stages of their journey. In the second round of data collection, the item rated as very important (mean = 4.92) was whether smart tourism technologies improve the tourist experience in all phases of their journey. The means recorded demonstrated an increase from 4.81 in the first round of data collection to 4.92 in the second round. Deviation from routine practices introduces aspects that form an uncertain environment.

The tourism industry is increasingly reliant on smart technologies due to rapid technological advances and the uncertainties caused by events such as COVID-19. These technologies improve tourism experiences in various ways: online booking, mobile maps, navigation applications, digital check-ins and keyless entry, smart room controls, virtual tours, real-time assistance using chatbots, contactless payments and mobile wallets, transportation applications, and review platforms. By integrating smart tourism technologies into the tourism experience, businesses can create a personalized and enjoyable journey for tourists. This generates positive reviews, tourists' satisfaction, and repeated visits.

In opposition to this perspective, the least important item in the first and second round of data collection was that Chatbots and robots can recognize specific keywords and provide corresponding answers from a predetermined set (mean = 3.09). The mean recorded a decrease from 3.18 in the first round of data collection to 3.09 in the second one.

Chatbots and robots recognize specific keywords and offer responses based on predefined patterns or rule sets. Language translation, accommodation booking, and customer support chatbots were analyzed in the present study. Even though they lack real understanding, they can be very good at pattern recognition and can assist tourists in different tasks.

In both rounds of the study, the eighteen participants in the sample were asked to rate the importance level of the actual use of smart technologies. Table 10 presents their mean scores for each item.

Table 9. Advantages/disadvantages of using smart tourism technology, in the experts' opinion.

Items	Round	Mean
Smart tourism technologies improve the tourists' experience throughout all phases of their journey.	First round	4.81
	Second round	4.92
Intelligent technology applications improve tourists' response and service times to reduce problem resolution time.	First round	4.71
	Second round	4.82
Intelligent technology can make routine tasks more rapid.	First round	4.69
	Second round	4.74
Intelligent applications—robotic process automation (RPA)—improve business processes.	First round	4.54
	Second round	4.59
Smart software systems help with operational analytics processes.	First round	4.45
	Second round	4.68
Smart technologies improve advertising.	First round	4.39
	Second round	4.26
Receptions can be managed by robots that are proficient in multiple languages.	First round	4.41
	Second round	4.59
Human employees may perceive this technology as a threat.	First round	3.33
	Second round	3.21
Smart tourism applications lack an individualized approach.	First round	3.27
	Second round	3.16
Chatbots and robots can recognize specific keywords and provide corresponding answers from a predetermined set.	First round	3.18
	Second round	3.09

Table 10. The actual use of smart technologies, in the experts' opinion.

Items	Round	Mean
AI, VR, and IoT are used in personalized services for tourists.	First round	4.60
	Second round	4.69
AI is utilized in lodging services.	First round	4.49
	Second round	4.58
Using tablets to replace printed menus in restaurants.	First round	4.37
	Second round	4.40
AI is used in car parking systems at accommodation/restaurants.	First round	4.29
	Second round	4.33
Check-in based on facial recognition is used to enable tourists to bypass queues during the registration process.	First round	4.18
	Second round	4.26

Table 10. *Cont.*

Items	Round	Mean
Tourists can control accommodation/restaurant functions using their personal mobile devices.	First round	3.89
	Second round	4.19
VR permits tourists to experience a service as if they were physically present, even before deciding whether to book or not.	First round	3.79
	Second round	4.01
An AI-empowered content solution is utilized to create a customized destination guide based on the tourists' travel information.	First round	3.59
	Second round	3.72
Digital keys that use a smartphone application.	First round	3.35
	Second round	3.48
Tourism services use automation technologies.	First round	3.29
	Second round	3.19
Room service robots deliver food, beverages, and additional towels to tourists.	First round	2.86
	Second round	2.67

The most important item, in the experts' opinion, is the usage of AI, VR, and IoT in personalized services for tourists (mean = 4.60). The mean score recorded an increase from 4.60 in the first round of data collection to 4.69 in the second round. These technologies contribute to the tourists' experience in the following ways: personalized recommendations, virtual tours, wearable devices, location-based services, interactive navigation, and biometric authentication. The integration of these technologies contributes to a perfect and more captivating travel experience. The combination of AI, VR and IoT is making travel more convenient, engaging, and personalized for modern users.

The least important item in the first and second round of data collection was room service robots delivering food, beverages, and additional towels to guests (mean = 2.97). The mean recorded a decrease from 2.86 in the first round to 2.67 in the second round of data gathering. Romania is known for its contributions to the technology industry. In this context, the tourism industry tries to develop robotics to improve tourist services. In the experts' opinion, these robots could help to minimize costs and ensure timely deliveries.

5. Discussion and Conclusions

Research on this topic mainly includes case studies on smart tourism destinations [54,55,89] and the application of STTs in touristic destinations or tourist attractions [95–98]. The aim of this study was to analyze the relationships between tourists' profiles, their satisfaction with the use of smart technologies, and their revisit intentions towards Romanian touristic regions and to identify experts' perspectives regarding the use of smart tourism technologies.

This study's primary objective was to identify the elements that contribute to tourists' degree of satisfaction with Romanian touristic regions. The results present three attribute-level satisfaction factors: Factor 1—"AI technologies", Factor 2—"IoT technologies", and Factor 3—"VR technologies". The results confirm the multi-factored structure of consumer satisfaction [99].

The second objective of the research was to analyze whether tourist segments with different reasons for returning have distinct levels of satisfaction. The results suggest that segments with distinct reasons for visiting the country reported different degrees of satisfaction. According to the fifth tourist segment, work, leisure, and eclectic visitors were most satisfied with "AI technologies" (mean = 4.89; 4.78; 4.67 points), cultural visitors were satisfied with "VR technologies" (mean = 4.79 points), and nature travelers presented the greatest mean scores for their satisfaction with the "IoT technologies" factor (mean = 4.89 points). The results show an increased percentage of satisfied tourists who

rated these attribute-level satisfaction factors with scores greater than or equal to 4 points on a 5-point Likert scale [100].

The third objective of the study was to determine whether the analyzed tourism regions reported different degrees of tourist satisfaction. The results of the study showed significant differences between the studied Romanian tourism regions in terms of their satisfaction factors at the attribute level. The results show differences between the analyzed regions regarding their smart technology types. The destination of Transylvania obtained the highest means for the factor "AI technologies" (mean = 4.80 points), while Banat and Crișana, Dobrogea, and Maramureș obtained the highest means for the factor "IoT technologies" (mean = 4.71; 4.10; 3.88 points), and Bucovina and Moldova and Walachia and Oltenia obtained the highest means for the factor "VR technologies" (mean = 4.02; 4.09 points). These findings regarding the adaptation of smart technologies to different tourism segments and regions have significant implications for tourism destination management. Here are some important considerations: creating customizations for specific segments of tourists; developing a technology infrastructure that is adaptable to the preferences of different regions; implementing smart technologies with a focus on universal design principles to ensure accessibility for all tourists, including those with disabilities or varying levels of technological literacy; and implementing smart technologies that promote sustainable tourism practices.

The fourth objective of the study was to decide whether the smart tourist segment influences tourists' intention to return to the analyzed regions. The results demonstrated that there are some differences between tourist segments. The highest percentage of respondents with a desire to return was recorded for workcations, while the lowest percentage was recorded for eclectic tourists.

An analysis of the impact of the attributes of each destination on tourist satisfaction provides information on the strengths and weaknesses of the destination regions. The highest average satisfaction with AI technologies was found in Transylvania. Banat and Crișana recorded the highest mean satisfaction for IoT technologies, and Wallachia and Oltenia for VR technologies. The lowest average of all the analyzed destinations was recorded for VR technology. These results must be addressed by the regional management organizations of the analyzed zones. These results are useful for future strategies.

Regarding the correlation between tourist segments and their return intention, the results demonstrated that most tourists intend to revisit these destinations due to their use of smart technologies. The present study confirms that tourist satisfaction is a key element in the management of attracting tourists by developing their revisit intention [9,101–104]. It also confirmed the significant relationship between satisfaction and loyalty that has been presented in different studies [28,105]. This study highlights that the highest proportion of respondents who intended to return was recorded for workcations.

By developing the capabilities of smart technologies, tourism organizations can offer personalized services, perform management operations, and develop sustainable practices. Smart technologies offer benefits to both tourists and organizations. Chatbots and virtual assistants can provide quick and personalized responses to consumer queries. Machine learning helps to identify consumer choices and behavior and offers recommendations for itineraries, accommodation, and various activities. AI tools analyze historical data on booking patterns, pricing trends, and occupancy rates and can focus on inventory management and supply chain logistics. AI algorithms can examine the data on the environmental impact of tourism to develop and implement sustainable practices in the industry.

Regarding our qualitative research, our fifth and sixth objectives, this study's contributions are twofold. Firstly, it provides information from experts on the future development trends in the industry. Secondly, it offers suggestions for sustainable development, including comprehensive directions. The eighteen experts reached a consensus, which was used to reduce deviation and acquire an agreement.

This research offers practical implications for specialized organizations and for the government to develop sustainable policies based on smart technologies. Smart technologies

have a double role in the tourism industry. They can enhance satisfaction by introducing new experiences and addressing concerns, while also improving the operational efficiency and sustainability of tourist destinations. The use of smart solutions will be essential in creating smooth and unforgettable tourism experiences as the industry develops. According to the experts, the use of smart technologies has a significant advantage in improving tourists' experiences at all stages of their journey and is disadvantageous regarding chatbots and robots that can recognize specific keywords and provide corresponding answers from a predetermined set. Also, the usage of AI, VR, and IoT in personalized services for tourists is considered an important aspect of their role. The following aspects require further improvement: individuals may perceive technologies as a threat, smart tourism applications can lack an individualized approach, and room service robots could be developed. It is essential to pay attention to personalization and user privacy. It is important that technologies deliver personalized experiences while respecting tourists' privacy rights and that they offer transparency across all practices. Enhancing travel experiences, offering operational efficiency and resource management, and focusing on tourist engagement and interaction are some practical implications of smart tourism technologies.

Smart technologies contribute to the development of sustainable tourism through smart destination management, smart mobility, digital platforms, augmented reality (AR), and virtual reality (VR) and use Blockchain for transparency. In analyzing dynamic resources, the data on tourist behaviors and traffic patterns can assist decision-makers in optimizing tourism operations to promote sustainability. Using predictive analytics to forecast tourism periods and distribute visitor flows more evenly can prevent over-congestion in certain areas. Online platforms can showcase eco-certified accommodations, simplifying the process of selecting environmentally responsible lodging options. Mobile apps that offer details on sustainable tourism practices, eco-friendly attractions, and responsible travel tips can enable tourists to make environmentally conscious decisions. The implementation of smart technologies (smart lighting, heating, ventilation, and air conditioning systems) in accommodation can lead to reduced energy consumption. VR offers virtual tours of destinations and tourism attractions and can minimize the desire for physical travel, offering a more sustainable way for people to explore various places. AR helps tourists in the process of interpreting their experiences of cultural and natural places. Blockchain technology offers transparency in the supply chain of tourism-related products (i.e., sustainable practices). Implementing efficient technologies to monitor water usage in hotels, resorts, and public spaces can promote water conservation practices.

This study's conclusions contribute to the theoretical knowledge on and practical guidance for the development of new smart technologies in the tourism industry. From an academic perspective, this study provides support for the analysis of technology-enhanced touristic experiences. It contributes to the literature by highlighting the status of modern technologies in the tourism industry and the correlation between smart tourist profiles, their satisfaction levels, and their return intentions. Also, this study offers an expert's perspective on the topic due to the interviews conducted with specialists from the tourism sector. From a practical perspective, the results of this study provide useful management and marketing information for decision-makers. The novelty of this paper consists of its complex research in the context of Romanian tourism, which examines how intelligent technologies affect tourists' experiences, improve tourists' satisfaction, and offer a high-level experts' perspectives regarding the use of these technologies. The findings of this research could be used in an international context to improve the development of smart sustainable tourism. The practical application of these research findings for decision-makers from tourism organizations involves a holistic approach that focuses on technological, cultural, regulatory, and sustainability aspects. By taking advantage of such perspectives, tourism organizations can improve the effectiveness of their smart technology solutions. The present study can be reproduced in other geographical areas with similar characteristics. The research findings can be used by researchers for comparative analyses or to generate collaborations for new studies, increasing the impact of this research across various geographical areas.

This study has some limitations. The data analyzed in the quantitative research were cross-sectional. A future possibility is the replication of this study using longitudinal data. Despite the efforts made to create a comprehensive survey, there is a risk of survey error in terms of coverage, non-response, and sampling errors. These could affect the generalizability of our results. The data collectors were volunteers of different ages and from different studies. This study does not focus only on one specific area of the tourism industry but provides a general view of the current issue with respect to all Romanian touristic regions. The present research based on the Delphi method did not examine each type of tourism product in depth, but offered a general view on smart tourism technologies, which constitutes a limitation of this research.

Our future research intends to analyze more elements, which would lead to a more comprehensive understanding of the satisfaction of smart tourists and may provide new satisfaction factors at the attribute level. New research will study the present hypotheses in other developing countries. Purposeful tourist destinations are products which are constantly changing and evolving in accordance with the control exercised by their stakeholders [106]. Future research will focus on analyzing the tourism area life cycle (TALC) model according to which touristic destinations, if they are understood as global products, have a life cycle similar to those of classical consumer products. Future research will focus on studying how AI can develop more sustainable polices, such as waste management, the promoting of sustainable tourism behavior, and conservation methods. Some examples are investigating the use of AI-driven dynamic pricing strategies that focus on environmental and social factors (pricing strategies that influence tourists' behavior) and investigating the influence of cultural differences on the acceptance and impact of AI-driven solutions on various tourism destinations, including wildlife supervision and the conservation of habitats.

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