

Tourist Satisfaction of Smart Tourism Technologies of Hotels in Cagayan Valley

Edmer Ramirez Sibbaluca^a and Gretchen Addun Jallorina^a

edmersibbaluca@csu.edu.ph/jallorinagretchen07@gmail.com

^a Cagayan State University-Andrews Campus

Abstract

Smart tourism technologies (STTs), such as digital guest applications, face recognition systems, and tailored digital assistants, are developed to enhance visitors' experiences and improve how tourism operations function. Despite the growing use of STTs, there is limited research on their impact in rural areas like Cagayan Valley. This study aimed to assess tourists' awareness and satisfaction with STTs in this region, specifically examining factors like accessibility, security, and personalization. The research also investigated how awareness and satisfaction differed based on tourists' demographic details and profiles. The goal was to provide insights for developing sustainable tourism in Cagayan Valley. A descriptive correlational research design was used, involving 385 tourists from Cagayan Valley. Participants' awareness and satisfaction with STTs were assessed using a modified questionnaire, which tourism experts validated. Data were gathered through both online and in-person surveys. The analysis included frequency counts, Likert scales, and Analysis of Variance (ANOVA) to determine differences in satisfaction across demographic variables. This study specifically focused on domestic tourists' satisfaction with STTs. The majority of these tourists were young, female, and college-educated. The findings show high awareness and a clear preference for mobile phones, electronic payment systems, Wi-Fi, and smart televisions. This highlights technology's significant role in leisure travel experiences. Respondents preferred personalized, secure, and informative experiences, but concerns about accessibility and security remained. Significant differences in awareness and satisfaction were noted based on age, gender, education level, income, and occupation. The study suggests improving user interfaces, increasing interactivity, and ensuring strong data security. Policy recommendations include educational campaigns and technological upgrades to meet evolving visitor needs.

Keywords: Smart Tourism Technologies, Cagayan Valley, Tourism

INTRODUCTION

Tourism has become one of the fastest-growing industries worldwide, significantly contributing to economic development and cultural exchange. In recent years, the rapid increase in mobile internet users and the widespread availability of smart devices have transformed technology from a helpful tool into an essential part of the tourism industry. Integrating smart technologies into tourism is now necessary, not optional. This is because it improves how resources are managed, supports sustainable growth, and enhances the well-being of both local residents and visitors (Buhalis & Amaranggana, 2014).

Smart tourism technologies (STTs) have changed how tourists interact with destinations, offering personalized and deeply engaging experiences (Huang et al., 2017). These technologies combine new ideas that increase convenience, personalization, and service effectiveness, thereby improving the tourist experience. Together, these STTs boost operational efficiency and raise tourist satisfaction, which helps destinations compete more effectively in the digital age.

Research shows that smart tourism technologies positively affect travel satisfaction, influencing tourists' happiness and their likelihood of returning (Lee et al., 2018). However, the adoption of STTs varies around the world. Regions such as the Cagayan Valley in the Philippines have received little research on the effects of these technologies. Cagayan Valley, known for its beautiful landscapes, rich

culture, and growing tourism industry, offers a unique setting to study how effective STTs are. Despite its potential, the region faces challenges including limited digital infrastructure, varying levels of digital skills, and slower adoption of advanced technologies compared to cities. This digital gap could impact tourist satisfaction and reduce the region's ability to compete as a tourism destination.

This study is important because it addresses the missing information about how smart tourism technologies affect tourist satisfaction in Cagayan Valley. By looking specifically at the local impact of STTs, this research aims to provide destination marketers and policymakers with useful information to help tourism destinations transform digitally in a sustainable way. The findings will assist hotel operators and other stakeholders involved in Cagayan Valley in improving their services by making the best use of STTs. This will ultimately boost tourist satisfaction and increase the chance of repeat visits. In addition, the study will help close the digital gap by offering insights into problems with digital skills, infrastructure, and data privacy. This research will also serve as a useful guide for future studies examining how effective STTs are in rural and developing tourism areas.

This study aimed to examine tourists' awareness and satisfaction with Smart Tourism Technologies (STTs) within the region, focusing on several key areas. First, the research aimed to characterize respondents based on demographic (age, gender, highest educational attainment), socio-economic (income level, occupation), and psychographic factors (type of tourist, purpose of travel, commonly used gadgets and technologies in hotels, and stage of smart tourism technology adoption). Second, it evaluated respondents' awareness of STTs across six dimensions: accessibility, informativeness, interactivity, personalization, security, and overall travel experience. Third, it assessed respondents' satisfaction with these technologies, using the same six dimensions. Furthermore, the study investigated whether significant differences in awareness and satisfaction levels existed when respondents were grouped by their previously identified profiles. Ultimately, this research sought to provide insights into the effectiveness of STTs in enhancing tourist experiences within the Cagayan Valley region and to offer recommendations for improving their implementation. The study was guided by two null hypotheses: (1) There is no significant difference in respondents' levels of awareness when grouped by their profile variables, and (2) There is no significant difference in respondents' levels of satisfaction when grouped by their profile variables.

METHODOLOGY

This study used a descriptive correlational research approach to explore how different factors relate to smart tourism technologies in Cagayan Valley. A total of 385 local and international tourists participated, all of whom had visited Cagayan Valley and used smart tourism technologies there. Cochran's formula, appropriate for large populations, determined the sample size.

Researchers collected data using a custom-designed questionnaire completed by the participants. A panel of five experts validated the questionnaire: a representative from the Department of Tourism (which accredits accommodation facilities), two educators in Applied Business Tools and Technologies for the Tourism Industry, and two industry professionals. The questionnaire had two sections: Part I gathered demographic details from respondents, while Part II measured their awareness and satisfaction with smart tourism technologies in Cagayan Valley.

Several statistical methods processed the collected data. Frequency counts described respondent profiles and identified challenges encountered with smart tourism technologies. A 5-point Likert Scale measured awareness and satisfaction. The weighted mean formula was applied, and the resulting weighted means for awareness and satisfaction were interpreted using a predetermined scale. Finally, Analysis of Variance (ANOVA) identified significant differences in satisfaction levels across demographic and other profile variables.

RESULTS AND DISCUSSIONS

I. Profile of the Respondents

Table 1a *Frequency and Percentage Distribution of Respondents According to Demographic Profile*

Variables	Categories	Frequency (n=385)	Percent
Age	20 and below	12	3.12
	21 to 30	330	85.71
	31 to 40	25	6.49
	41 to 50	13	3.38
	51 and above	5	1.30
Gender	Male	67	17.40
	Female	318	82.60
Highest Educational Attainment	Junior High School	2	0.52
	Senior High School	22	5.71
	Undergraduate	53	13.77
	College	284	73.77
	Post Graduate	24	6.23

Table 1a details the demographic characteristics of the participants, including their age, gender, and highest educational attainment. Of the 385 participants, the majority (n=330) were between 21 and 30 years old. This age distribution suggests that the study primarily included young adults, who are typically in the early phases of their professional or academic development. Females constituted the predominant group, accounting for 82.60% (n=318) of the total participants. Regarding educational attainment, the largest category comprised college graduates, numbering 284 participants.

Table 1b *Frequency and Percentage Distribution of Respondents According to Socio-Economic Profile*

Variables	Categories	Frequency (n=385)	Percent
Monthly Income/ Budget	4,000 and below	151	39.22
	4,001 to 8,000	37	9.61
	8,001 to 12,000	39	10.13
	12,001 to 16,000	30	7.79
	Above 16,000	128	33.25
Occupation	Professional and technical personnel (teachers, doctors, engineers)	61	15.84
	Tertiary industry personnel (catering service, driver, salesman, etc.)	65	16.88
	Self Employed/ Business Owner	47	12.21
	Public sector employees, civil servants, government staff	20	5.19
	Students	100	25.97
	Freelance/ Part time	15	3.90
	Workers	7	1.82
	Others	70	18.18

Table 1b outlines the respondents' socio-economic characteristics, specifically their monthly income and occupation. The largest group (n=151) reported earning ₱4,000 or less per month. This income distribution indicates a notable presence of respondents in both the lowest and highest income categories. Students represented the predominant occupational group, comprising 25.97% (n=100) of the respondents. This implies a significant inclusion of younger individuals, likely still engaged in

educational pursuits.

Table 1c *Frequency and Percentage Distribution of Respondents According to Psychographic Profile*

Variables	Categories	Frequency (n=131)	Percent
Type of Tourist	Domestic	321	83.38
	International	64	16.62
Purpose of Travel	Leisure	229	59.48
	Business	101	26.23
	Business and Leisure	55	0.14
Commonly Used gadgets for travel	Phone	381	98.96
	Tablets/Ipad	32	8.31
	Smart Watch	20	5.19
Commonly used Smart Technologies in Hotels	e-guest app	51	13.25
	electronic vehicle as shuttle	15	3.90
	e-booking (mobile app)	205	53.25
	Facial recognition	9	2.34
	fast check in (mobile app)	26	6.75
	e-payment	216	56.10
	e-concierge	3	0.78
	Smart room key (keyless entry thru ving cards)	143	37.14
	Delivery robots	5	1.30
	Wifi /-Wireless internet access	357	92.73
	In room voice assistant	3	0.78
	Smart TV	380	98.70
Stage of using Smart Technologies in Hotels	Pre-arrival	384	99.74
	Arrival	382	99.22
	Occupancy	385	100.00
	Departure	216	56.10
	Post-departure	1	0.26

Table 1c details the psychographic characteristics of respondents, categorized by tourist type, travel purpose, commonly used personal devices, preferred smart technologies in hotels, and the specific trip stages during which these technologies are utilized. The majority of respondents (n=321) were domestic tourists, while international tourists constituted a smaller proportion (n=64). Regarding travel purpose, leisure (n=229) was identified as the most frequent reason, indicating a strong preference for leisure-oriented travel. In terms of personal devices used during travel, mobile phones were dominant, employed by 381 respondents, which underscores their essential role for modern travelers. Smart technologies implemented in hotels also demonstrated widespread adoption, with e-payments (56.10%) and mobile e-booking (53.25%) being prominent examples. Finally, technology utilization was universal during the occupancy stage (100%). However, a significant decline was observed during departure (56.10%), with usage becoming minimal in the post-departure stage (0.26%).

II. Level of Awareness of the Respondents to Smart Tourism Technologies

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Table 2a *Level of Awareness of the Respondents to Smart Tourism Technologies in terms of Accessibility*

Accessibility	Mean	Descriptive Interpretation
I find it easy to navigate through a hotel's website.	4.97	Very Aware
I can use Smart Tourism Technology anytime and anywhere.	4.74	Very Aware
I am able to understand the information presented by smart tourism technology.	4.34	Very Aware
I can easily access a hotel's smart tourism technology feature.	4.12	More than aware
I can easily access Smart Tourism Technology from a variety of other related websites	3.99	More than aware
I can search without a complicated sign-up process at a hotel website.	3.82	More than aware
I can easily obtain information at all stages of my trip.	3.55	More than aware
Category Mean	4.22	Very aware

Table 2a presents respondents' awareness of the accessibility of smart tourism technologies. Overall, respondents report a high level of awareness regarding the accessibility of these technologies, as indicated by a category mean of 4.22. Although the overall perception of accessibility is high, specific areas require improvement, particularly in simplifying registration processes and enhancing the ease of obtaining trip-related information.

A study by Davenport et al. (2020) demonstrated the critical role of user experience in digital interfaces for customer satisfaction. Intuitive and easily navigable websites encourage users to explore services for longer periods, thereby increasing the likelihood of booking. Conversely, Buhalis and Law (2008) identified complex registration processes as a primary deterrent for users interacting with travel websites. The moderate score of 3.82 indicates that while some users find current registration procedures acceptable, a clear opportunity for improvement exists. Implementing simpler, more user-friendly registration processes could enhance user satisfaction, given Müller et al.'s (2017) findings that users are less likely to abandon a website when services can be accessed quickly and easily without extensive sign-up requirements.

Table 2b *Level of Awareness of the Respondents to Smart Tourism Technologies in terms of Informativeness*

Informativeness	Mean	Descriptive Interpretation
I intend to use smart phone applications (e.g., location-based apps as well as apps used for booking tickets and hotels, checking traffic status/pollution, etc.)	4.95	Very Aware
The information I got from a hotel's website is reliable and accurate.	4.90	Very Aware
I intend to use web-based technologies in finding accommodation facilities for my future travel for comparison.	4.82	Very Aware
There is a wealth of information provided by the hotel's smart tourism technologies.	4.75	Very Aware
I get good quality information from the hotel's smart tourism technologies.	4.58	Very Aware
When checking-in in hotels in Cagayan Valley, Smart Tourism Technology provides me with useful information about the accommodation options.	4.57	Very Aware
The information I gather from the hotel's website helps me make a sensible purchasing decision.	4.53	Very Aware
Category Mean	4.73	Very Aware

Table 2b shows how aware respondents are of the informational features of smart tourism technologies. The data indicate a high level of awareness regarding the informational usefulness of

these technologies, with a combined average score of 4.73.

In addition, respondents are strongly aware of the benefits of using web-based platforms to compare future accommodation choices (average score = 4.82) and recognize the extensive information provided by hotel-specific smart tourism technologies (average score = 4.75). Information obtained from hotel websites is also seen as very effective in helping people make informed purchasing decisions (average score = 4.53). This highlights the important role of smart tourism technologies in delivering comprehensive and practical information to travelers.

These notably high scores align with earlier research by Gretzel et al. (2015), which emphasized the central role of mobile applications in the travel experience, especially for immediate access to information. Similarly, Tussyadiah and Fesenmaier (2009) underlined the significant value of location-based services and mobile booking applications for their ability to provide travelers with immediate, personalized, and context-aware information.

The slightly lower average scores related to how effectively this information influences purchasing decisions suggest that, although respondents find the provided data useful, it may not always be the only factor guiding their choices. Schwabe et al. (2014) similarly observed that, while digital tools offer valuable information, travelers often include other factors, such as peer reviews and personal recommendations, in their final purchase decisions. This gap between information availability and purchasing confidence indicates a need for tourism businesses to add more persuasive features.

Table 2c *Level of Awareness of the Respondents to Smart Tourism Technologies in terms of Interactivity*

Interactivity	Mean	Descriptive Interpretation
It is easy to share tourism information content on Smart Tourism Technology.	4.97	Very Aware
The hotel's STTs provide for a venue for comments and feedback.	4.96	Very Aware
I can find many other travelers' questions and answers on Smart Tourism Technology.	4.87	Very Aware
The hotel's STTs provide me with a smooth flow of my travel.	4.86	Very Aware
The hotel's smart tourism technology that I use is interactive.	4.84	Very Aware
The hotel's website response time is acceptable.	4.63	Very Aware
The hotel's Smart Tourism Technology is highly responsive to me.	4.44	Very Aware
Category Mean	4.80	Very Aware

Table 2c presents respondent awareness of the interactive features of smart tourism technologies. Overall, respondents demonstrate a high level of awareness regarding these technologies' interactive capabilities ($M=4.80$). Furthermore, respondents recognize the inherent interactivity of smart tourism technologies used in hotels ($M=4.84$) and consider the response time of hotel websites acceptable ($M=4.63$).

The very high scores observed for content sharing and feedback mechanisms align with the findings of Gretzel et al. (2015), who emphasize the critical role of interactivity in modern tourism experiences. Tussyadiah and Fesenmaier (2009) also argue that the ability to share experiences, submit reviews, and engage in social interactions on tourism platforms fosters a sense of community and increases customer engagement.

Table 2d *Level of Awareness of the Respondents to Smart Tourism Technologies in terms of*

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Personalization

Personalization	Mean	Descriptive Interpretation
Smart Tourism Technology allows me to receive tailored information.	4.87	Very Aware
The tourism information provided by Smart Tourism Technology meets my needs.	4.85	Very Aware
Smart Tourism Technology provides me with easy-to-follow paths and links.	4.82	Very Aware
I can interact with Smart Tourism Technology in order to get information tailored to my specific needs.	4.80	Very Aware
Category Mean	4.84	Very Aware

Table 2d shows respondents' understanding of the personalization features within smart tourism technologies. The data indicate a high level of awareness among respondents regarding these features, with an average score of 4.84. This suggests that respondents have a strong grasp of smart tourism technologies' personalization capabilities. These findings are consistent with the work of Gretzel and Yoo (2008), which highlighted the importance of personalized information in shaping travel experiences.

Table 2e Level of Awareness of the Respondents to Smart Tourism Technologies in terms of Security

Security	Mean	Descriptive Interpretation
When I use STTs, I am assured of confidentiality of information.	4.88	Very Aware
Smart Tourism Technology Provides adequate security measures to protect my personal information.	4.84	Very Aware
When I use Smart Tourism Technology, I don't worry about collecting too much personal information.	4.82	Very Aware
When I use Smart Tourism Technology, I believe my privacy is respected.	4.75	Very Aware
Category Mean	4.82	Very Aware

Table 2e shows respondents' awareness of the security features in smart tourism technologies. The data reveals that respondents have a high level of awareness about the security features these technologies offer. A mean score of 4.82 indicates a strong understanding of these security aspects among respondents. This understanding highlights the critical role of confidentiality, protecting personal data, and respecting privacy in building user trust and satisfaction. This finding supports the research by Martin & Murphy (2017), who emphasize that secure data handling and privacy protection are vital for trust in tourism technologies.

Table 2f Level of Awareness of the Respondents to Smart Tourism Technologies in terms of Travel Experience

Travel Experience	Mean	Descriptive Interpretation
I feel that using Smart Tourism Technologies enriches my tourist experience in some ways.	5.00	Very Aware
Using these types of technology is rewarding.	5.00	Very Aware
By using smart tourism technologies, I have more time to accomplish my work.	5.00	Very Aware
Smart technology applications create more memorable experiences during my travel.	5.00	Very Aware

My overall evaluation of my destination experience is positive and favorable	5.00	Very Aware
The presence of STTs affects my attitude toward checking in a hotel	4.92	Very Aware
Category Mean	4.99	Very Aware

Table 2f presents the level of awareness of respondents to smart tourism technologies in terms of travel experience. As shown, respondents are very aware of the impact of these technologies on their travel experience, with a category mean of 4.99. Additionally, respondents reached a consensus ($M=5.00$) that smart technology applications create more memorable experiences and contribute to an overall positive journey.

This finding supports previous research, such as Xiang and Fesenmaier (2017), which demonstrated that smart tourism technologies significantly enhance traveler experiences, making them more rewarding, time-efficient, and memorable.

Level of Satisfaction of the Respondents to Smart Tourism Technologies

Table 3a Level of Satisfaction of the Respondents to Smart Tourism Technologies in terms of Accessibility

Accessibility	Mean	Descriptive Interpretation
I am able to understand the information presented by the smart tourism technology.	4.17	More than satisfied
I find it easy to navigate thru a hotel's website.	4.01	More than satisfied
I can easily access Smart Tourism Technology from a variety of other related websites	3.95	More than satisfied
I can use Smart Tourism Technology anytime and anywhere.	3.87	More than satisfied
I can search without a complicated sign-up process at a hotel website.	3.54	More than satisfied
I can easily obtain information at all stages of my trip.	3.24	Satisfied
I can easily access a hotel's smart tourism technology feature.	3.04	Satisfied
Category Mean	3.69	More than satisfied

Table 3a presents the level of satisfaction of respondents with smart tourism technologies in terms of accessibility. As shown, respondents are more than satisfied with the accessibility features of these technologies, with a category mean of 3.69. It corresponds to the research of Sigala (2018) which emphasizes the importance of clear communication and intuitive navigation on websites. The high satisfaction with understanding information and navigating hotel websites aligns with research showing that well-designed interfaces and clear information contribute to positive user experiences, enhancing satisfaction with technology.

However, participants reported the lowest satisfaction levels regarding hotel STT features ($M=3.04$). This finding supports the work of Gretzel and Yoo (2008), which highlights the significance of continuous information access throughout the travel journey.

Table 3b Level of Satisfaction of the Respondents to Smart Tourism Technologies in Terms of Informativeness

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Informativeness	Mean	Descriptive Interpretation
The information I gather from the hotel's website helps me make a sensible purchasing decision.	4.21	Very Satisfied
When checking-in in hotels in Cagayan Valley, Smart Tourism Technology provides me with useful information about the accommodation options.	4.19	More than satisfied
I intend to use smart phone applications (e.g., location-based apps as well as apps used for booking tickets and hotels, checking traffic status/pollution, etc.)	4.12	More than satisfied
There is a wealth of information provided by the hotel's smart tourism technologies.	4.10	More than satisfied
The information I get from a hotel's website is reliable and accurate.	4.05	More than satisfied
I get good quality of information from the hotel's smart tourism technologies.	3.59	More than satisfied
I intend to use web-based technologies in finding accommodation facilities for my future travel for comparison.	3.42	More than satisfied
Category Mean	3.69	More than satisfied

Table 3b presents the level of satisfaction of respondents with STTs in terms of informativeness. Respondents are very satisfied with the information they gather from a hotel's website, as it helps them make sensible purchasing decisions ($M=4.21$). This connects to the study of Xiang and Fesenmaier (2017) that highlights that travelers increasingly rely on smart technologies to gather information that simplifies travel decisions, such as checking in at hotels. The high satisfaction scores in these areas are consistent with research indicating that technology-driven services, such as detailed hotel information, are key to enhancing user satisfaction.

Table 3c Level of Satisfaction of the Respondents to Smart Tourism Technologies in terms of Interactivity

Interactivity	Mean	Descriptive Interpretation
The hotel's STTs provide me with a smooth flow of my travel.	4.22	Very Satisfied
The hotel's STTs provide for a venue for comments and feedback.	4.09	More than satisfied
I can find many other travelers' questions and answers on Smart Tourism Technology.	4.08	More than satisfied
The hotel's smart tourism technology that I use is interactive.	3.93	More than satisfied
It is easy to share tourism information content on Smart Tourism Technology.	3.24	Satisfied
The hotel's website response time is acceptable.	3.17	Satisfied
The hotel's Smart Tourism Technology is highly responsive to me.	3.15	Satisfied
Category Mean	3.95	More than satisfied

Table 3c presents the level of satisfaction of respondents with smart tourism technologies in terms of interactivity. The overall category mean is 3.95, indicating that respondents are more than satisfied with the interactivity of these technologies. It builds upon the study of Alalwan et. al., (2017) which emphasizes how interaction and real-time feedback features can significantly enhance customer engagement with smart tourism technologies, aligning with the high satisfaction levels observed in the respondents' feedback on interactivity.

While still more than satisfied, respondents indicate a slightly lower level of satisfaction with the interactivity of the smart tourism technology they use ($M=3.93$), and the ease of sharing tourism information content ($M=3.24$).

Table 3d Level of Satisfaction of the Respondents to Smart Tourism Technologies in terms of Personalization

Personalization	Mean	Descriptive Interpretation
Smart Tourism Technology allows me to receive tailored information.	4.10	More than satisfied
The tourism information provided by Smart Tourism Technology meets my needs.	4.09	More than satisfied
Smart Tourism Technology provides me with easy-to-follow paths and links.	3.24	Satisfied
I can interact with Smart Tourism Technology in order to get information tailored to my specific needs.	3.24	Satisfied
Category Mean	4.67	More than satisfied

Table 3d presents the level of satisfaction of respondents with STTs in terms of personalization. The overall category mean is 4.67, indicating that respondents are more than satisfied with the level of personalization provided by these technologies.

The present findings align with Koo and Choi's (2020) study, which demonstrated that personalized recommendations improve the traveler experience. Specifically, the provision of highly relevant content through tourism technologies significantly enhances user satisfaction.

Table 3e Level of Satisfaction of the Respondents to Smart Tourism Technologies in terms of Security

Security	Mean	Descriptive Interpretation
When I use STTs, I am assured of confidentiality of information.	3.84	More than satisfied
When I use Smart Tourism Technology, I don't worry about collecting too much personal information.	3.78	More than satisfied
When I use Smart Tourism Technology, I believe my privacy is respected.	3.24	Satisfied
Smart Tourism Technology Provides adequate security measures to protect my personal information.	3.24	Satisfied
Category Mean	3.52	More than satisfied

Table 3e details respondent satisfaction regarding the security of STTs. With an overall mean score of 3.52, respondents indicated a high level of satisfaction with these technologies' security provisions. Furthermore, the responses suggest a general comfort level concerning privacy implications related to STT use. This aligns with the study by Huang & Benyoucef (2013), which emphasizes that user confidentiality and minimal data collection are crucial for fostering trust in digital technologies. This

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high satisfaction with security aspects observed in the survey corroborates findings that users tend to feel more secure when they believe their personal information is not over-collected.

Table 3f Level of Satisfaction of the Respondents on Smart Tourism Technologies in terms of Travel Experience

Travel Experience	Mean	Descriptive Interpretation
My overall evaluation of my destination experience is positive and favorable	4.51	Very Satisfied
By using smart tourism technologies, I have more time to accomplish my work.	4.35	Very Satisfied
Smart technology applications create more memorable experiences during my travel.	4.18	More than satisfied
The presence of STTs affects my attitude toward checking in a hotel	4.10	More than satisfied
Using these types of technology is rewarding.	4.06	More than satisfied
I feel that using Smart Tourism Technologies enriches my tourist experience in some ways.	3.85	More than satisfied
Category Mean	4.18	More than satisfied

Table 3f presents respondents' satisfaction with Smart Tourism Technologies (STTs) regarding their travel experience. Specifically, respondents reported high satisfaction with their overall destination experience ($M=4.51$) and perceived that STTs allowed them more time for tasks ($M=4.35$). These findings suggest that STTs improve convenience and lead to a more positive overall experience. This observation aligns with previous research by Zeng and Zhao (2016), which highlighted that smart tourism technologies promote more efficient task completion, resulting in a more positive and less demanding travel experience.

Test of difference on the Level of Awareness

Table 4a Test of Difference on the Level of Awareness of the Respondents to Smart Tourism Technologies when grouped according to Demographic Profile

Profile	Variables	t-test/F-ratio	p
Age	Accessibility	3.84	.005
	Security	3.73	.005
Gender	Accessibility	2.31	.022
Highest Educational Attainment	Accessibility	0.85	.492
	Informativeness	2.64	.033

Table 4a presents the findings from an analysis investigating differences in respondents' awareness of Smart Tourism Technologies (STTs) across various aspects. Statistical analysis indicated that age significantly affects awareness of both accessibility ($p = .005$) and security ($p = .005$). More precisely, Tukey's HSD post-hoc test identified distinct patterns: individuals aged 20 and younger exhibited significantly greater awareness of accessibility compared to those in the 21-30 and 31-40 age groups. Additionally, a notable difference in security awareness was observed between the 21-30 age group and those aged 51 and older, with the latter group demonstrating higher awareness. These results align with the work of Lee and Kim (2021), who propose that younger individuals often show greater awareness and acceptance of smart technologies due to their familiarity and ease of use with digital tools.

Regarding gender, the analysis identified a significant difference in accessibility awareness ($p = .022$). Men reported a higher level of accessibility awareness. This corroborates a study by Choi and Lee, C. (2019), which suggests that men often have greater awareness of accessibility features in digital platforms, possibly due to increased engagement with technology and a preference for using it to

enhance convenience.

Finally, educational attainment influenced the informativeness variable ($p = .033$), with respondents having higher education levels demonstrating greater awareness of the information presented by smart tourism technologies. This finding supports Wu and Li (2018), who indicate that individuals with higher educational levels are more likely to recognize and value detailed and informative content in digital tourism tools. This may account for the increased awareness of informativeness among highly educated respondents in the present study.

Table 4b Test of Difference on the Level of Awareness of the Respondents to Smart Tourism Technologies when grouped according to Socio-Economic Profile

Profile	Variables	F-ratio	p
Monthly Income	Accessibility	12.05	<.001
	Informativeness	2.52	.041
Occupation	Interactivity	15.56	<.001
	Accessibility	10.07	<.001
	Interactivity	4.97	<.001
	Security	2.19	.035

Table 4b displays the outcomes of a statistical analysis that compared participants' understanding of Smart Tourism Technologies (STTs), categorized by their socioeconomic characteristics, specifically monthly income and occupation. The findings reveal a substantial impact of monthly income and occupation on participants' awareness of smart tourism technologies. The analysis indicated that individuals with higher incomes reported greater awareness regarding accessibility and interactivity features. Similarly, professional and technical personnel showed a better understanding of these features compared to other occupational groups. This pattern can be explained by the higher probability that individuals with greater incomes interact with and are familiar with advanced technological tools, a category that includes smart tourism technologies. Existing research indicates that resources associated with higher income, such as better access to devices and technology, significantly contribute to this greater interaction (Gartner & Huang, 2020). Taken together, these findings emphasize the important role of socioeconomic factors in shaping awareness of smart tourism technologies.

Table 4c Test of Difference on the Level of Awareness of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Type of Tourist and Purpose of Travel)

Profile	Variables	t-test/F-ratio	p
Type of Tourist	Accessibility	-0.86	.392
Purpose of Travel	Accessibility	26.71	<.001
	Informativeness	8.66	<.001
	Interactivity	22.07	<.001
	Personalization	5.84	.003
	Security	3.24	.040

Table 4c presents the results of a statistical test examining respondents' awareness of smart tourism technologies (STTs) when grouped by their psychographic profile, specifically their tourist type and purpose of travel. No significant differences in awareness were observed across any variables for the type of tourist. This suggests that the type of tourist (domestic vs. international) did not significantly influence their reported level of awareness regarding STTs. In contrast, the purpose of travel showed significant differences across several variables. Specifically, the analysis indicated significant differences in awareness related to accessibility, informativeness, interactivity, personalization, and security, depending on the purpose of travel.

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Table 4d Test of Difference on the Level of Awareness of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Commonly Used gadgets for travel)

Commonly Used gadgets for travel	Variables	t-test	p
Phone	Accessibility	-1.23	.221
Tablets/Ipad	Accessibility	1.27	.206
	Personalization	-2.54	.011
Smart Watch	Accessibility	-0.66	.513

The findings in Table 4d suggest that, among the three main travel devices, tablets (including iPads) distinctly influence users' awareness of personalization features in smart tourism technologies. Specifically, tablet users were more likely to notice personalized content. This observation supports earlier research by Feng and Kim (2018), who proposed that tablets and similar devices, due to their larger screens and superior interactive capabilities, enhance user engagement with personalized services. The significant finding for tablets in the current study thus reinforces the idea that users may be more receptive to personalized features when interacting with content on a more expansive and interactive platform.

Table 4e Test of Difference on the Level of Awareness of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Commonly used Smart Technologies in Hotels)

Commonly used Smart Technologies in Hotels	Variables					
	Accessibil ity	Informati veness	Interactiv ity	Personali zation	Security	Travel Experienc e
e-booking (mobile app)	-2.29*	-0.02	0.55	1.35	-1.58	-0.33
e-payment	-5.45***	1.26	4.65***	2.80**	1.32	1.65
e-concierge	0.87	0.98	-1.87	-1.34	15.36***	-0.76
Smart room key (keyless entry thru ving cards)	0.93	2.67**	0.67	1.56	0.67	1.95
Wifi /-Wireless internet access	-2.85**	2.09*	2.29*	0.13	0.66	-0.22

*significant at .05

**significant at .01

***significant at .001

Table 4e presents an analysis of how respondents' awareness of smart tourism technologies (STT) differs depending on the smart technologies commonly found in hotels. The results indicate that certain smart technologies within hotels significantly influence how respondents understand various aspects of STT. Specifically, e-payment systems and e-concierge services notably impact awareness of interactivity, personalization, and security. Gretzel et al. (2015) highlight that e-payment systems create seamless interactions between tourists and service providers, thereby increasing awareness of and engagement with digital tourism tools. Furthermore, Chung et al. (2015) found that free and fast Wi-Fi access in hotels and tourist destinations encourages tourists to interact with other STTs. These findings collectively demonstrate that different smart technologies have varying effects on tourists' awareness of STT, suggesting that some technologies are more effective at improving awareness across several aspects than others.

Table 4f Test of Difference on the Level of Awareness of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Stage on using Smart Technologies in Hotels)

Stage on using Smart Technologies in Hotels	Variables					
	Accessibil ity	Informati veness	Interactiv ity	Personali zation	Security	Travel Experienc

						e
Arrival	1.66	-11.03***	-5.75***	-14.75***	-15.36***	-0.49
Departure	-5.45***	1.26	4.65***	2.80**	1.32	1.65

*significant at .05

**significant at .01

***significant at .001

Table 4f presents an analysis of how people's awareness of smart tourism technologies (STTs) differs depending on when they use these technologies during their hotel stay. The findings show that tourists' awareness of smart technologies remains consistent before they arrive at the hotel.

Upon arrival, most aspects of smart technologies, except for accessibility, showed significantly lower awareness. This suggests that the initial encounter with smart technologies when arriving might be confusing or difficult to use, potentially reducing how useful people perceive these features to be or their overall awareness of them, a point also made by Liu et al. (2017).

During the departure phase, awareness of accessibility features showed a significant decrease ($t = -5.45$, $p < .001$), indicating that tourists are less mindful of smart technology accessibility as they leave. Similarly, Zhou et al. (2017) observed that when tourists become more accustomed to smart technologies throughout their visit, they tend to view interactive and personalized features more favorably.

Test of difference on the Level of Satisfaction

Table 5a Test of Difference on the Level of Satisfaction of the Respondents to Smart Tourism Technologies when grouped according to Demographic Profile

Profile	Variables	t-test/F-ratio	p
Age	Accessibility	0.50	.736
	Informativeness	1.02	.396
Gender	Accessibility	-0.66	.510
	Informativeness	-1.43	.154
Highest Educational Attainment	Accessibility	0.91	.458
	Informativeness	2.60	.036

Table 5a examines how demographic characteristics influence respondents' satisfaction with smart tourism technologies (STTs). Overall, education appears to be the most influential demographic factor affecting STT satisfaction, particularly concerning the perceived informativeness and personalization of these technologies. These findings are consistent with Chen et al. (2016), who reported that individuals with higher educational attainment tend to appreciate interactive and personalized features in STTs. This appreciation is attributed to their greater technological fluency and improved capacity to evaluate the practical utility of these features. Conversely, demographic factors such as age and gender did not significantly influence STT satisfaction levels. This indicates that STTs may possess broad appeal across these demographic groups.

Table 5b Test of Difference on the Level of Satisfaction of the Respondents to Smart Tourism Technologies when grouped according to Socio-Economic Profile

Profile	Variables	F-ratio	p
Monthly Income	Accessibility	0.76	.552
	Informativeness	6.00	<.001
Occupation	Accessibility	0.36	.926
	Informativeness	4.46	<.001

The analysis in Table 5b examines the differences in respondents' satisfaction levels with smart tourism technologies based on their socio-economic profile, including monthly income and occupation. For monthly income, a significant difference was found in informativeness ($F = 6.00$, $p = <0.001$). This suggests that respondents with different income levels have different perceptions of how informative smart tourism technologies are. For occupation, a significant difference was found in

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informativeness ($F = 4.46$, $p = <0.001$), with certain occupation groups rating the informativeness of smart tourism technologies differently.

Moreover, Schuckert et al. (2015) investigated how individuals in service industries, such as hospitality and tourism, perceive smart technologies. Their findings indicated that these professionals generally report higher satisfaction with the informativeness of these technologies. This is attributed to their greater familiarity and more frequent professional use of such systems.

Table 5c Test of Difference on the Level of Satisfaction of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Type of Tourist and Purpose of Travel)

Profile	Variables	t-test/F-ratio	p
Type of Tourist	Accessibility	-0.58	.565
Purpose of Travel	Accessibility	2.32	.100
	Informativeness	49.45	<.001
	Interactivity	11.90	<.001
	Personalization	25.99	<.001
	Security	3.51	.031

Table 5c examines the variance in satisfaction with STTs based on psychographic profiles specifically tourist type and travel purpose. Analysis reveals that tourist type (domestic vs. international) does not significantly influence satisfaction across any evaluated dimensions. The findings suggest that tourist origin does not significantly influence satisfaction levels across the evaluated metrics, indicating comparable appreciation for smart tourism technologies among domestic and international travelers. Beldona and McCleary (2017) discovered that how satisfied tourists are with technology depends on personal factors, such as their individual preferences and how familiar they are with technology.

In contrast, travel purpose emerged as a significant determinant of satisfaction regarding informativeness ($F = 49.45$, $p < .001$), interactivity ($f = 11.90$, $p < .001$), personalization ($f = 25.99$, $p < .001$), and security ($f = 3.51$, $p = .031$).

Table 5d Test of Difference on the Level of Satisfaction of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Commonly Used gadgets for travel)

Commonly Used gadgets for travel	Variables	t-test	p
Phone	Accessibility	-1.21	.228
	Travel Experience	-2.16	.032
Tablets/Ipad	Accessibility	0.86	.390
Smart Watch	Accessibility	-0.48	.632

Table 5d presents the test of difference on the level of satisfaction of respondents with smart tourism technologies when grouped according to their commonly used gadgets for travel. For respondents who commonly use a phone while traveling, no significant differences were found in any of the variables: accessibility ($p = .228$), informativeness ($p = .183$), interactivity ($p = .130$), personalization ($p = .196$), and security ($p = .051$). However, significant result is for Page 21 of 26 - AI Writing Submission Submission ID trn:oid:::3618:138792028 Page 21 of 26 - AI Writing Submission Submission ID trn:oid:::3618:138792028 20 travel experience, where users who commonly use phones for travel reported significantly lower satisfaction ($t = -2.16$ $p = 0.032$).

Table 5e Test of Difference on the Level of Satisfaction of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Commonly used Smart Technologies in Hotels)

Commonly used Smart Technologies	Variables					
	Accessib	Informat	Interacti	Personali	Security	Travel

in Hotels	ility	iveness	vity	zation		Experien ce
e-booking (mobile app)	-0.70	1.78	0.27	0.35	-0.97	-2.66**
Facial recognition	-0.26	-2.25*	-2.02*	-2.48*	-1.58	-0.19
fast check in (mobile app)	-0.42	-3.47***	-2.05*	-2.92**	-1.39	-0.41
e-payment	-0.64	5.70***	1.64	3.19**	0.41	1.04
Smart room key (keyless entry thru ving cards)	0.27	2.00*	0.61	1.39	1.05	0.38

*significant at .05

**significant at .01

***significant at .001

Table 5e presents an analysis of differences in respondent satisfaction with smart tourism technologies (STTs), categorized by the smart technologies commonly used in hotels. The findings indicate that several smart technologies in hotels significantly influence respondents' satisfaction across various dimensions of STTs. E-payment systems were found to enhance respondent satisfaction, particularly regarding informativeness and personalization. This aligns with research by Park et al. (2020), which indicates that these systems substantially improve transactional efficiency, thereby positively influencing respondent satisfaction, especially regarding information delivery. However, insufficient system accessibility or user-friendliness can hinder overall satisfaction concerning ease of access. Conversely, technologies like rapid check-in applications and facial recognition systems appear to negatively impact satisfaction in areas such as informativeness, interactivity, and personalization. Zhou et al. (2019) observed that while mobile check-in applications provide efficiency, they may not sufficiently deliver personalized information or interactive features that enhance the guest experience, consequently leading to decreased satisfaction in these particular aspects. In contrast, smart room keys are linked to higher satisfaction regarding informativeness, and Wi-Fi access also enhances satisfaction concerning both informativeness and interactivity.

Table 5f Test of Difference on the Level of Satisfaction of the Respondents to Smart Tourism Technologies when grouped according to Psychographic Profile (Stage on using Smart Technologies in Hotels)

Stage on using Smart Technologies in Hotels	Variables					
	Accessibi lity	Informati veness	Interacti vity	Personali zation	Security	Travel Experien ce
Departure	-0.64	5.70***	1.64	3.19**	0.41	1.04
Post-Departure	-1.55	-1.35	-2.17*	-2.07*	-1.24	-1.53

*significant at .05

**significant at .01

***significant at .001

Table 5f illustrates differences in respondent satisfaction with Smart Technology Touchpoints (STTs), analyzed by the stage of smart technology use in hotels. A significant positive difference was found for security ($t=0.44$), suggesting guests perceive security features most favorably during the check-in process. This finding is consistent with Zhou et al. (2021), who observed that the arrival stage heightens security awareness as guests interact with keyless entry and identity verification systems.

The departure stage proved to be the most influential phase for positive perceptions of STTs. Specifically, results indicated significantly higher satisfaction concerning informativeness ($t=5.70$, $p<.01$) and interactivity ($t=1.64$). This implies that smart technologies used during check-out effectively address guests' needs for information and tailored engagement. Conversely, satisfaction levels significantly declined following departure. This trend supports the findings of Yao et al. (2020), who argued that post-service technologies—such as automated surveys or loyalty emails—are often

perceived as less meaningful or engaging once the physical service encounter has concluded, leading to a perceived drop in dynamic interaction..

CONCLUSION

Research indicates that user satisfaction with smart tourism technologies is influenced by several factors, including an individual's educational background, their travel objectives, and the specific technologies or devices they use. Technologies that improve information delivery, personalization, and security are often associated with increased satisfaction. Conversely, systems perceived as overly complex or lacking interactive features may diminish satisfaction. Furthermore, satisfaction levels typically change throughout the stages of technology use; travelers often report greater satisfaction as their familiarity and comfort with these technologies grow during their stay. This understanding can assist tourism industry stakeholders in tailoring their offerings to more effectively meet the diverse needs and expectations of their customers.

RECOMMENDATIONS

Based on the study's findings, the following recommendations are presented:

1. Hotel management and technology providers are advised to improve accessibility. This can be achieved by simplifying sign-up processes and making it easier to acquire travel information, as these areas currently show lower user satisfaction.
2. The Department of Tourism (DOT) should launch outreach and educational programs. These programs should focus on older adults and individuals with lower incomes to raise awareness of the advantages of smart travel technologies (STTs) and encourage their use.
3. Technology developers are advised to focus on making smart travel technologies (STTs) more interactive. This involves improving how quickly they respond and simplifying how information is shared to increase user satisfaction. At the same time, Hotel Operations Teams should ensure that the information provided through smart technologies is accurate and complete, especially regarding booking and accommodation comparisons.
4. Smart technology providers should invest in improving their facial recognition and e-booking systems. This is crucial because these features have received low user satisfaction scores and require significant changes to meet user needs.

LITERATURE CITED

- Buhalis, D., & Amaranggana, A. (2015). Smart Tourism Destinations Enhancing Tourism Experience Through Personalisation of Services. *Information and Communication Technologies in Tourism 2015*, 377–389. https://doi.org/10.1007/978-3-319-14343-9_28
- Çeltek, E. (2023). Analysis of Smart Technologies Used in Smart Hotels. *Journal of Business Research-Turk*. <https://doi.org/10.20491/isarder.2023.1754>
- Chathoth, P. K., Ungson, G. R., Harrington, R. J., & Chan, E. S. W. (2016). Co-creation and higher order customer engagement in hospitality and tourism services. *International Journal of Contemporary Hospitality Management*, 28(2), 222–245. <https://doi.org/10.1108/ijchm-10-2014-0526>
- Elsayed, S., & Abed, M. (2018). Studying the Effectiveness of Using Smartphone's Apps on Raising Hotels' Occupancy and Operation's Efficiency. *Journal of Association of Arab Universities for Tourism and Hospitality*, 15(3), 111–116. <https://doi.org/10.21608/jaauth.2018.54014>
- Elshaer, A. M., & Marzouk, A. M. (2022). Memorable tourist experiences: the role of smart tourism technologies and hotel innovations. *Tourism Recreation Research*, 1–13. <https://doi.org/10.1080/02508281.2022.2027203>
- Gupta, S., Sufi, T., & Kumar Gautam, P. (2022, October 1). *Role of Technological Transformation in Shaping Millennials' Travel Behaviour: A Review*. IEEE Xplore.

<https://doi.org/10.1109/ICRITO56286.2022.9965175>

He, Z., Wu, L., & Li, X. (Robert). (2018). When art meets tech: The role of augmented reality in enhancing museum experiences and purchase intentions. *Tourism Management*, 68, 127–139. <https://doi.org/10.1016/j.tourman.2018.03.003>

Huang, C. D., Goo, J., Nam, K., & Yoo, C. W. (2017). Smart tourism technologies in travel planning: The role of exploration and exploitation. *Information & Management*, 54(6), 757–770. <https://doi.org/10.1016/j.im.2016.11.010>

Jamal, S., & Habib, M. A. (2020). Smartphone and daily travel: How the use of smartphone applications affect travel decisions. *Sustainable Cities and Society*, 53, 101939. <https://doi.org/10.1016/j.scs.2019.101939>

Kim, M. R. (2014). *The Relationship Between Leisure Traveler's hotel Attribute Satisfaction and Overall Satisfaction*. FIU Digital Commons. <https://digitalcommons.fiu.edu/hospitalityreview/vol31/iss1/12>

Lotan, M. M., & Patil, N. N. (2023, October 6). *Issues and Challenges Faced by Mobile Application Users and Developers*. https://www.researchgate.net/publication/374476366_Issues_and_Challenges_Faced_by_Mobile_Application_Users_and_Developers

No, E., & Kim, J. K. (2015). Comparing the attributes of online tourism information sources. *Computers in Human Behavior*, 50, 564–575. <https://doi.org/10.1016/j.chb.2015.02.063>

Paccoud, I., Baumann, M., Le Bihan, E., Pétré, B., Breinbauer, M., Böhme, P., Chauvel, L., & Leist, A. K. (2021). Socioeconomic and behavioural factors associated with access to and use of Personal Health Records. *BMC Medical Informatics and Decision Making*, 21(1).

UNWTO, 2019 - Google Search. (2019). Google.com. https://www.google.com/search?q=UNWTO%2C+2019&rlz=1C1VDKB_enPH1068PH1068&oq=UNWTO%2C+2019&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIHCAEQABiABDIHCAIQABiABDIICAMQABgWGB4yCagEEAAYFhgeMggIBRAAGBYHHjINCAYQABiGAXiABBiKBTINCAcQABiGAXiABBiKBTINCAgQABiGAXiABBiKBdIBBzkxNWowajeoAgiwAgE&sourceid=chrome&ie=UTF-8

Yeung, T. A., & Law, R. (2006). Evaluation of Usability: A Study of Hotel Web Sites in Hong Kong. *Journal of Hospitality & Tourism Research*, 30(4), 452–473. <https://doi.org/10.1177/1096348006290115>

Zhang, Y., Sotiriadis, M., & Shen, S. (2022). Investigating the Impact of Smart Tourism Technologies on Tourists' Experiences. *Sustainability*, 14(5), 3048.