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## Effect of Smart Tourism Technology Use on Memorable Tourism Experience: The Budapest Sample

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### Abstract

*Tourism sector is undergoing major changes due to rapid technological advancements, significantly shaping tourist experiences. Smart tourism technologies – such as digital apps, platforms and services – are transforming how tourists and destinations interact. These tools simplify travel planning, enhance access to information, offer more efficient, personalized experiences. Tourists find easier and more original solutions throughout their journeys, resulting in greater satisfaction and emotional connection to destinations. Positive emotions contribute to memorable travel experiences, which are essential for building lasting tourist-destination relationships. The integration of smart technologies supports not only the improvement of individual experiences but also the sustainable development of tourism destinations. This is especially relevant in the context of circular tourism, which emphasizes long-term value and resource efficiency. This study specifically explores the role of smart tourism technologies in creating unforgettable travel experiences, using Budapest as a case example, highlights their growing importance in the evolving tourism landscape.*

**Keywords:** Media Convergence Era, Broadcasters and Presenters, Dilemmas and Opportunities, Radio and Television, Digital Technology.

### Introduction

Tourism is among the world's most active and fastest-growing sectors, contributing greatly to the world economy. Tourism has a multistructural organization whereby people get a chance to travel to various destinations, enjoy some other services in the process, and create unforgettable experiences. Tourism is considered both a service sector catering to the needs of people and a tool supporting economic development at destinations. In this respect, with its economic, social, cultural, and environmental dimensions, the tourism industry creates deep influences on societies and individuals ((Ahsanah and Artanti, 2021; Ari, 2022). However, the challenge is to minimise the negative impacts of tourism and create circular tourism (Dávid et al., 2024).

Smart tourism integrates information and communication technologies into the tourism industry

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in such a way that it enhances tourist experiences to become effective, personalized, and more sustainable. It is an overall concept of being able to allow tourists to make use of technological innovations during their entire process, before, during, and after their trips to have a wiser, faster, and more delightful holiday (Brandao et al., 2021; Chandralal ve Valenzuela, 2013). In fact, smart tourism enhances individual experiences but also ramps up the competition in destinations and contributes to the sustainability of the tourism industry. Generally, it was examined in the relationship of smart tourism destinations with sustainability in the study of Samancioğlu et al., (2024) by data obtained from the tourism industry. The study also investigated how tourism destinations contribute to sustainability based on smart applications and how these applications identify with sustainable goals already set in the tourism sector.

Furthermore, these technologies contribute both to unforgettable experiences during travels and to emotional attachment (Ahsanah and Artanti, 2021). These tourism experiences are defined as the result of positive emotions and satisfaction derived by tourists from the destination, and such experiences strongly affect tourists' intentions to revisit the destination. Smart tourism technologies develop the competitiveness of destinations by offering solutions to meet tourists' needs and expectations. In this respect, while the comforts and novelties of technology enrich the experiences of tourists, it also contributes to the sustainable development of destinations. This current study focuses on how smart tourism technologies influence unforgettable experiences and revisit and recommend intentions of tourists, taking Budapest as an example. Budapest is considered a popular destination with its innovative tourism approaches, besides being an important city in terms of historical and cultural values. The scope of this study investigates how smart tourism technologies shape tourists' Budapest experiences and how these experiences, in turn, influence the decision to revisit and recommended tourists. In relation to the above, a visual content analysis was carried out by Michalkó et al., (2022:26-42) on Budapest's repositioning in the post-Covid-19 period. It checked how Budapest remade its tourism strategies in the post-pandemic period and how the process was reflected through visual content. Reddy and Kandi (2023) looked into tourists' perceptions toward smart tourism experiences in Budapest as a smart tourism destination. The study focused on how smart tourism technologies in Budapest influence tourists' experiences

Tourism in Budapest is such an important contributor to the economy and simultaneously one of those fields which allows the city international recognition. Therefore, Budapest's tourism with its diversified development and modern structure of services appears to be of special interest for the tourism community. The historical, cultural values of the city constitute a basis for this industry. Within the city boundaries are a number of historical buildings incorporated into the UNESCO World Heritage List. Among the most visited places in Budapest are Buda Castle, Matthias Church, Chain Bridge, and the panoramic view of the Danube River. These historical structures enable tourists to see the rich history of the city, which makes Budapest one of the best-preserved historical textures in Europe (Brandao et al., 2021).

The current study tries to investigate smart tourism technologies with unforgettable tourism experience and the effect of smart tourism technology use on memorable tourism experience a Budapest case study. The unprecedented expansion of digitalization and technological innovations in the current tourism industry shapes tourist-destination interactions in a rather dramatic way. Smart tourism technologies make tourists' travel experiences meaningful, personalized, and easily accessible. In this respect, the purpose of the study is to conduct a deep investigation regarding how these technologies influence tourists' destination experiences and how such influence forms tourist behavior. This research will try to indicate how the interactions

of tourists with smart tourism technologies strengthen their level of unforgettable experiences and positive perceptions of the destination.. In this regard, the present study tries to capture how the relationship between tourists' level of use of smart tourism technologies and their loyalty to the destination can be represented both from an emotional and cognitive standpoint. In the course of the study, because of its cultural and historical value, plus being advanced in the aspects of smart cities technologies, the study focuses more on Budapest for several reasons.

In general, this research tries to provide contributions to both academic literature and practice. The contribution in the literature area is expected to be an in-depth analysis of the relationships among unforgettable tourism experience, smart tourism Technologies. It enables destinations to be very responsive to tourist needs and to develop innovative solutions for them. In this context, it addresses how smart tourism technologies will affect not only the individual experience of tourists but also the wider performance and sustainability of the destination. It is known that unforgettable tourists increase the international competitiveness of the destinations, which provides long-term economic and social gains for them. Therefore, the contribution of smart tourism technologies to this process constitutes one of the focal points of the research. How smart technologies shape the travel decisions of tourists, increase the quality of time spent at destinations, and how the satisfaction obtained in this process reinforces their loyalty to destinations will be analyzed in detail.

## **Methodology**

This research was carried out as a cross-sectional study to examine the effect of smart tourism technologies on memorable tourism experience in Budapest.. The method used in the research was determined to be data collection with the survey technique, which is among the quantitative research methods. The research design was built on theses that explain the effects of the adoption of smart tourism technologies on memorable tourism experience. The study was conducted among tourists in Budapest. In this case, the research design was to look at the intensity of tourist smart tourism technologies adoption, how the smart tourism technologies affected their tourism experience,

The research population consists of tourists who have visited Budapest and have experience with the use of smart tourism technology. Domestic and foreign tourists form this population. Since Budapest is a city that is tourism-rich, the tourist activities of different cultures and geographies that use smart technology that impacts their tourism experience in the city have been researched under different emphases. The universe of the study has been determined in reference to the purpose of the study with regard to the tourism sector and the universality of smart technologies. The research sample was determined based on the principle of random sampling. To that end, tourists visiting various touristic areas in Budapest were invited to take part in the survey. The questionnaires were administered to the respondents in various manners. These methods included scanning QR codes and sending out questionnaires via e-mail. These methods enabled the participants to complete the questionnaire faster and more easily, and enabled tourists who interact with smart technologies to be targeted. As a result, the number of tourists who participated in the study was 400 people. These participants were selected from tourists who visited Budapest and shaped their tourism experiences with smart technologies.

In an increasingly digitalized tourism landscape, the integration of Smart Tourism Technologies (STTs) has reshaped the way tourists experience and engage with destinations.

In recent years, Smart Tourism Technologies (STTs) have become an integral part of enhancing

visitor experiences in various destinations (Gretzel et al., 2015). Key components such as security, accessibility, information provision, interactivity, and personalization play a vital role in shaping tourist satisfaction and experience quality (Neuhofer, Buhalis & Ladkin, 2015). Understanding how these dimensions contribute to memorable tourism experiences in a culturally rich and technologically advanced city like Budapest is critical for both academic insight and practical application.

### Research Question 1:

*How do the different dimensions of Smart Tourism Technologies (security, accessibility, informativeness, interactivity, and personalization) influence the memorable tourism experience in Budapest?*

- **Hypothesis 1a:** The security of smart tourism technologies significantly impacts to memorable tourism experience in Budapest
- **Hypothesis 1b:** The accessibility of smart tourism technologies significantly impacts to memorable tourism experience in Budapest
- **Hypothesis 1c:** The information of smart tourism technologies significantly impacts to memorable tourism experience in Budapest
- **Hypothesis 1d:** The interactivity of smart tourism technologies significantly impacts to memorable tourism experience in Budapest
- **Hypothesis 1e:** The personalization of smart tourism technologies significantly impacts to memorable tourism experience in Budapest

### Findings

The sample consists of 188 males (47.0%) and 212 females (53.0%). This suggests a relatively balanced gender representation, with a slight predominance of females. The majority of participants are single (226 individuals, 56.5%), while 174 participants (43.5%) are married. This indicates a higher proportion of single individuals in the sample. The largest age group is 18-25 years (142 individuals, 35.5%), followed closely by 26-35 years (132 individuals, 33.0%). Participants aged 36-45 years (60 individuals, 15.0%) and 46+ years (66 individuals, 16.5%) make up smaller proportions. The sample skews younger, with nearly 70% of participants under 35 years old. The majority of participants are employees (172 individuals, 43.0%). Other occupational categories include: Employer/Executive (56 individuals, 14.0%), Self-employed (56 individuals, 14.0%), Civil servants (40 individuals, 10.0%) and Other occupations (76 individuals, 19.0%). The largest occupational category is employees, while self-employed and executives each make up 14% of the sample (See Table 1).

Variables		Frequency	Percent
Gender	Male	188	47,0
	Female	212	53,0
Marital Status	Single	226	56,5

	Married	174	43,5
Age	18-25	142	35,5
	26-35	132	33,0
	36-45	60	15,0
	46+	66	16,5
Occupation	Civil Servant	40	10,0
	Employee	172	43,0
	Employer /Executive	56	14,0
	Other	76	19,0
	Self-employment	56	14,0

Table 1. Demographic Characteristics of Participants

The variable for security in Table 2 varies from a low of 5, a high of 14, a mean of 10.77, and a standard deviation of 1.97. This reflects that the assessments of security by the participants will normally be at a medium level, but there are some people who make lower or higher ratings. The skewness value is negative as -0.471, indicating data is skewed to the right, and so most of the participants' sense of security is above average. The kurtosis value is -0.008, indicating the data is quite close to normal distribution and there are not so many outliers. The accessibility variable is a bit more spread out with a range of 4 to 20, a mean of 14.87, and a standard deviation of 3.42. This outcome indicates that participants' views about accessibility are more varied and there is greater variance around the mean. The value of skewness is -0.415, revealing that the data is skewed to the right but less than the security variable. Here, the Kurtosis value of -0.113 represents that the data still remains close to a normal distribution but has slightly more extreme values. The Information variable has a higher range with a minimum of 5, a maximum of 25, a mean of 19.54 and a standard deviation of 3.62. This reflects that the participants' perceptions of information are more spread out and variable. A skewness figure of -0.731 indicates that the data are skewed to the right and most of the participants possess a high degree of information perception. The Kurtosis is positive with 1.481, indicating that the data includes a more pointed peak and extreme values. The Interactivity variable possesses a medium spread with a minimum of 4, a maximum of 20, a mean of 15.08 and a standard deviation of 3.20. The skewness of -0.626 indicates that the data is skewed right and the majority of the participants feel more interaction than the mean. Kurtosis of 0.559 indicates that the data has slightly sharper extreme values than the normal distribution, yet it is not sharp. The variable of personalization has medium spread with min 3, max 15, mean 11.40 and standard deviation 2.52. Skewness value of -0.769 indicates that data is skewed to the right and most participants' personalization perception is above average.

Variables	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Security	5	14	10.77	1.97	-.471	-.008
Accessibility	4	20	14.87	3.42	-.415	-.113
Information	5	25	19.54	3.62	-.731	1.481
Interactivity	4	20	15.08	3.20	-.626	.559
Personalization	3	15	11.40	2.52	-.769	.517
Memorable Tourism Experience	7	35	28.13	5.69	-1.112	1.276

Table 2. Minimum-Maximum Values, Mean-Standard Deviation Values, and Skewness-Kurtosis Values of Research Variables

Security is positively correlates with all other variables. The strongest correlation is observed with memorable tourism experience ( $r = .647, p < .001$ ). A moderate correlation exists with personalization ( $r = .445, p < .001$ ). Accessibility is strongly correlates with interactivity ( $r = .685, p < .001$ ), information ( $r = .650, p < .001$ ), and personalization ( $r = .741, p < .001$ ). Information is highly correlated with interactivity ( $r = .713$ ), personalization ( $r = .735, p < .001$ ), and memorable tourism experience ( $r = .689, p < .001$ ). Interactivity is strongly associated with personalization ( $r = .821$ ), memorable tourism experience ( $r = .713, p < .001$ ), and information ( $r = .713, p < .001$ ). Personalization has the strongest correlation with interactivity ( $r = .821, p < .001$ ), followed by memorable tourism experience ( $r = .787, p < .001$ ). Memorable Tourism Experience shows high correlations with all variables, particularly with personalization ( $r = .787, p < .001$ ), interactivity ( $r = .713, p < .001$ ). It is also significantly correlated with memorable tourism experience ( $r = .724, p < .001$ ). Additionally, it is positively associated with memorable tourism experience ( $r = .638, p < .001$ ) and personalization ( $r = .453, p < .001$ ). See Table 3.

Variables	1	2	3	4	5	6	7
1. Security	1						
2. Accessibility	.360**	1					
3. Information	.367**	.650**	1				
4. Interactivity	.332**	.685**	.713**	1			
5. Personalization	.445**	.741**	.735**	.821**	1		
6. Memorable Tourism Experience	.647***	.682***	.689***	.713***	.787***	1	

Table 3. Correlation Between Research Variables

A series of independent samples t-test analysis were conducted to examine whether the means of the research variables differ by gender. The results indicate that there is no significant difference in the means of any research variable based on gender ( $p > .05$ ). The findings are presented in Table 4 and Figure 1. For the security variable in Table 4, the mean is 10.89 for males and 10.67 for females. The standard deviations are 1.87 and 2.06 for males and females

respectively. The value of  $t = 0.800$  and the  $p$ -value is 0.425, signifying that security perception does not significantly differ for both genders. The mean of the male gender for the variable Accessibility is 15.03 and 14.73 for the female gender. Standard deviation is 3.12 for men and 3.69 for women.  $t$ -value is 0.628 and  $p$ -value is 0.531, indicating no significant difference between gender in terms of accessibility perception. Mean of men for the Information variable is 19.43 and 19.64 for women. Standard deviation is 3.45 for men and 3.79 for women.  $t$ -value is -0.419 and  $p$ -value is 0.675, therefore no significant difference in perception of information among the genders. In Interactivity variable, males' mean is 15.11 and females' mean is 15.07. Males' standard deviation is 3.05 and females' standard deviation is 3.35.  $t$ -value is 0.089 and  $p$ -value is 0.929, therefore no significant difference among the genders in perception of interactivity. In the Personalization variable, males have an average of 11.50 and females 11.31. Standard deviation is 2.07 for males and 2.88 for females.  $t$ -value = 0.526 and  $p$ -value = 0.600, so no significant difference is found between two genders regarding personalization perception. In the Memorable Tourism Experience variable, the average for males is 28.64 and for females 27.69. Men's standard deviation is 5.29 and women's standard deviation is 6.02. The  $t$ -value is 1.179 and  $p$ -value is 0.240, indicating that there is no statistical difference in unforgettable tourism experiences across genders.

Variables	Gender	n	Mean	SD	95% Confidence Interval		$t$	$p$
					Lower	Upper		
Security	Male	188	10,89	1.87	-.33	.78	.800	.425
	Female	212	10,67	2.06				
Accessibility	Male	188	15,03	3.12	-.65	1.26	.628	.531
	Female	212	14,73	3.69				
Information	Male	188	19,43	3.45	-1.23	.80	-.419	.675
	Female	212	19,64	3.79				
Interactivity	Male	188	15,11	3.05	-.86	.94	.089	.929
	Female	212	15,07	3.35				
Personalization	Male	188	11,50	2.07	-.52	.90	.526	.600
	Female	212	11,31	2.88				
Memorable Tourism Experience	Male	188	28,64	5.29	-.64	2.54	1.179	.240
	Female	212	27,69	6.02				

Table 4. Comparison of Research Variable Means by Gender

Table 4 shows the comparison of the research variables by marital status. The  $t$ -test results for

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each variable show whether singles and married individuals' differences are statistically significant. The singles' mean is 10.79 and the married individuals' mean is 10.76 in the Security variable. This is a very minute difference and the t-value is 0.103 and p-value is 0.918, indicating that there is no significant gender gap in the security perception. For the Accessibility variable, married individuals' mean is 14.71 and singles' mean is 14.99, again very small difference is observed and t-value is 0.569 and p-value is 0.570 and it indicates marital status does not create any considerable difference in feeling accessibility. In the Information variable, singles' mean is 19.42 and the mean of marrieds is 19.70. This variation is also very minimal, having a t-value of -0.550 and a p-value of 0.583, indicating that there is no major difference in attitude towards information whether one is married or not. The singles mean is 15.00 while the marrieds mean is 15.20 in the Interactivity variable.

Variables	Marital Status	n	Mean	SD	95% Confidence Interval		t	p
					Lower	Upper		
Security	Single	226	10.79	2.02	-.53	.59	.103	.918
	Married	174	10.76	1.92				
Accessibility	Single	226	14.99	3.12	-.69	1.24	.569	.570
	Married	174	14.71	3.80				
Information	Single	226	19.42	3.27	-1.31	.74	-.550	.583
	Married	174	19.70	4.06				
Interactivity	Single	226	15.00	3.09	-1.10	.71	-.427	.670
	Married	174	15.20	3.37				
Personalization	Single	226	11.42	2.38	-.66	.77	.158	.875
	Married	174	11.37	2.72				
Memorable Tourism Experience	Single	226	28.02	5.49	-1.87	1.34	-.331	.741
	Married	174	28.29	5.97				

Table 4. Comparison of Research Variable Means by Marital Status

Table 6. is a table of comparison of the means of the research variables across age groups and includes the results of the ANOVA test for each variable. In general, no meaningful differences appear between age groups. In the variable Security, even though age groups differ minimally, the F-value is 1.283 and the p-value is 0.281, indicating age groups do not create a decisive difference in realizing security. In the Accessibility variable, similar to security, there is no key difference between age groups with an F-value of 0.164 and the p-value at 0.920. For the Information variable, the F-value is 0.697 and p-value is 0.555, which indicates that there is no



significant difference due to age. For the Interactivity variable, the F-value is 0.934 and the p-value is 0.425, indicating that there is no significant difference among age groups. No significant difference is found across age groups in the Personalization variable with an F-value of 0.146 and a p-value of 0.932. Although there is a minimal difference in age groups in the Memorable Tourism Experience variable, this difference is not significant with an F-value of 0.498 and a p-value of 0.684.

<b>Variables</b>	<b>Age</b>	<b>n</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>p</b>
Security	18-25	142	10.89	1.83	1.283	.281
	26-35	132	10.41	2.16		
	36-45	60	11.17	2.02		
	46+	66	10.91	1.81		
	Total	400	10.78	1.97		
Accessibility	18-25	142	14.82	2.78	.164	.920
	26-35	132	14.70	3.54		
	36-45	60	15.13	3.68		
	46+	66	15.09	4.26		
	Total	400	14.87	3.43		
Information	18-25	142	19.17	2.82	.697	.555
	26-35	132	19.47	4.19		
	36-45	60	20.23	3.86		
	46+	66	19.85	3.82		
	Total	400	19.54	3.63		
Interactivity	18-25	142	14.66	2.56	.934	.425
	26-35	132	15.06	3.77		
	36-45	60	15.53	3.43		
	46+	66	15.64	3.01		
	Total	400	15.09	3.20		
Personalization	18-25	142	11.35	1.96	.146	.932
	26-35	132	11.33	2.93		
	36-45	60	11.37	2.92		
	46+	66	11.67	2.46		
	Total	400	11.40	2.53		
Memorable	18-25	142	27.73	4.65	.498	.684

Tourism Experience	26-35	132	27.94	6.80		
	36-45	60	28.43	5.86		
	46+	66	29.12	5.27		
	Total	400	28.14	5.69		

Table 6. Comparison of Research Variable Means by Age Groups

## Conclusion, Discussion and Recommendations

This study explored the impact of Smart Tourism Technologies (STTs) on memorable tourism experiences in Budapest, with particular attention to five dimensions: security, accessibility, informativeness, interactivity, and personalization. The findings revealed that all these dimensions are significantly and positively associated with memorable tourism experiences. Among them, personalization and interactivity emerged as the strongest influencers, followed closely by informativeness, accessibility, and security (Chung & Koo, 2015; Gretzel et al., 2015). Moreover, the research found no statistically significant differences in perceptions across gender, marital status, or age groups. This suggests that the perceived value and influence of smart tourism technologies on experiences are relatively uniform across demographic categories, aligning with the inclusivity principles discussed by Sigala (2018) and Wang et al. (2013). These findings underscore the importance of STTs as universally applicable tools for enhancing tourist satisfaction and loyalty in culturally rich urban destinations like Budapest.

The findings of this research emphasize the crucial role that Smart Tourism Technologies (STTs) play in enriching the quality of tourism experiences in Budapest. The significant positive correlations between STT dimensions—security, accessibility, informativeness, interactivity, and personalization—and memorable tourism experiences suggest that these technologies contribute holistically to tourist satisfaction. Among these, personalization ( $r = .787$ ) and interactivity ( $r = .713$ ) exhibited the strongest associations. This reinforces the idea that tourists highly value experiences tailored to their individual needs and preferences, as echoed by Buhalis and Sinarta (2019), who stress the importance of "nowness" and real-time personalization. When tourists can interact with digital systems and receive personalized suggestions or support, their engagement with the destination deepens. This aligns with Neuhofer et al. (2015), who emphasized the transformative power of co-created, interactive digital services in enhancing emotional attachment to destinations. Informativeness ( $r = .689$ ) also proved to be a key contributor, highlighting the importance of comprehensive and accurate information in tourists' planning and on-site navigation processes, particularly in dense cultural environments like Budapest (Tussyadiah, 2020). Given Budapest's historical richness and cultural density, tourists benefit significantly from smart tools that provide context-aware guidance and background information (Huang et al., 2013). Interestingly, accessibility ( $r = .682$ ) and security ( $r = .647$ ) also showed substantial correlations with experience quality. This reveals that even fundamental elements—such as ease of use, user-friendly interfaces, and secure platforms—remain essential for creating a stress-free environment where tourists can focus on enjoyment rather than logistics or safety concerns (Gretzel et al., 2015; Chung & Koo, 2015). The demographic analysis showed no significant differences based on gender, marital status, or age, suggesting that smart tourism technology benefits are perceived similarly across diverse tourist groups. This further supports the inclusivity potential of STTs, reinforcing that when designed effectively, they serve a broad user base regardless of background (Yoo & Gretzel, 2011; Sigala, 2018).

In sum, these findings support the notion that STTs not only enhance the operational efficiency of tourism services but also foster deeper emotional and cognitive connections between visitors and destinations. Budapest's integration of smart technologies into its tourism infrastructure illustrates how heritage cities can evolve into digitally augmented cultural spaces without compromising historical integrity (Brandão et al., 2021; Michalkó et al., 2022). Budapest, as a case study, proves that historical and cultural heritage combined with technological advancement can elevate the city's global tourism competitiveness. The findings also emphasize that smart technologies do more than simplify logistics; they contribute directly to the emotional and cognitive dimensions of travel, fostering memories that form the basis of future loyalty.

The strong correlation between personalization and memorable experiences supports the idea that tourists value services tailored to their individual needs and preferences (Buhalis & Amaranggana, 2014). Similarly, interactivity and information accessibility not only aid in trip planning but also enrich the journey itself, empowering tourists and fostering deeper engagement (Chung & Koo, 2015; Buhalis & Sinarta, 2019).

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