Tourist perception on smart tourism experiences: The case of Budapest as a smart tourism destination

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Abstract

The rapid technological innovation brings new opportunities for tourism development. More tourism destinations are relying on smart technologies to attracts tourists to visit and enrich their tourism products. This study assesses how tourists experience the use of smart tourism technologies (STT) Information and Communication Technology (ICT), accessibility, interactivity, and security) at destinations. Although studies in smart tourism have increased recent years, little research has evaluated tourists' perception on smart tourism technologies usage. This study used Budapest as a smart tourism destination. Descriptive survey research design was adopted and sampled 256 international tourists who visited Budapest during August to November 2022. This study results indicated that accessibility is the most effective factor affecting smart tourism technology experiences in Budapest and interactivity is least. STT experience is shown to be significantly associated with travel experience.

Keywords: smart tourism, smart technologies, tourist perception, tourism development

Introduction

The rapid growth of the economy and the enhancement of the living standards of people have accelerated the growth of tourism, as stressed by Zhang and Li (2022). The tourism industry is not unfamiliar with the now global trend of increasing adoption of information and communication technologies (Cornejo Ortega & Malcolm, 2020), and in the day and age of big data, the application of Internet of Things (IoT) technology to the tourism industry is essential for further economic and technological progression (Zhang & Li, 2022). As a result of these swift technological developments, the tourism industry inevitably underwent major changes as well, and these developments entailed the appearance of the concept of smart tourism. In a smart tourism setting, stakeholders play a huge role in maximizing the experience smart tourism destinations (STDs) have to offer. Cornejo Ortega & Malcolm (2020) highlighted the importance of stakeholder perception in smart tourism, in terms of collecting qualitative data that may be used to meet the management requirements of STDs in the future. The appearance of smart cities and STDs opened up new research areas to be explored. This field is extremely under-researched in Hungary, barely any research is found on the topic, despite the long existence of the concept. A previous study has been made by Pinke-Sziva & Keller (2021) on smart tourism in the case of events in Hungary, Székesfehérvár, but the focus was solely on smaller cities, moreover little to no attention was paid to stakeholder participation and perception, as it was not the aim of the paper. Stakeholder perception was explored by Cornejo Ortega & Malcolm (2020) in the case of Puerto Vallarta as a potential STD, and some useful insights were given, however the destination hugely differs from Budapest, Hungary, so further research is needed. The main objectives of the research is to analyze tourists experience on the use of STT, ICT, accessibility, interactivity, and security) at destinations. More specifically, the

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smart tourism experience that the Budapest has to offer, and a professional point of view on digitalizing the industry. The purpose of the paper incorporates finding answers to the set-out questions about smart tourism aspects in Budapest based on research that is going to be made on tourist perception.

Literature review

Understanding the concept of smart tourism

Since smart tourism is such an area that is still in need to be further discovered and understood by tourism stakeholders, it is crucial for us too to understand the concept in detail. Many researchers in the tourism and hospitality field have tried to find and provide meaning to the concept, including Xiang et al. (2015). In their paper, they establish that smart tourism is basically a progression from traditional tourism, by integrating information and ICT tools into physical infrastructure, which means actively using ICT for tourism activities in a smart tourism destination (Xiang et al., 2015). They also describe smart tourism destinations as destinations that are built on innovative technologies, thus contributing to the sustainable development of the area and that it increases the quality of tourist experience and improves living conditions in the area, which is the main aspect of the topic (Xiang et al., 2015).

Based on researches written in the past the most specific way a smart tourism destination can be described is that it is a destination, where high technology, such as ICTs, are used to exchange real-time information related to tourism between tourism stakeholders, such as tourists and service providers (Jovivic, 2017). A destination can become smart when it takes advantage of the technology that is already available in a smart city for the purpose of improving the tourism experience for tourists in the area by personalizing and making tourism products and services visible to them, also by allowing local tourism stakeholders, such as tourism companies, destination management organizations, and institutions to make an advantage of these technologies (Mandić & Garbin Praničević, 2019)

Technological foundation of smart destinations / Smart Tourism Technologies (STTs)

Without technology the idea of smart cities would not exist and without smart cities smart tourism destinations would not have appeared either, so I would like to examine the bases of smart tourism destinations further and more carefully so that we can fully grasp the meaning. Jovovic (2017) states that in terms of ICTs there are specific ones that are especially important for smart tourism, for instance Internet of Things (IoT) or Cloud Computing (Jovivic, 2017). Giacomo Del Chiappa and Baggio (2015) discuss in his paper that smart tourism technology (ICTs, Internet of Things and Cloud Computing, Artificial Intelligence, Big data and many more) plays a very important role in sharing information between tourism stakeholders, which increases innovation and the competitiveness of the destination (Del Chiappa & Baggio, 2015). In their research paper Lu et al. (2021) stated that the information and communication technology is crucial for a business to thrive in our economy. Individuals are able to use ICT tools to collect information on any tourism or travel item from anywhere they have access to it, which means tourism businesses can share their services and product with potential clients from all around the world (Lu et al., 2021). Xiang et al. (2015) stated that for a smart tourism destination ICT based technology is crucial for an improved tourism experience, also better information sharing between consumers and suppliers for consumer satisfaction.

The main advantage of the interconnected technology smart cities and smart tourism destinations use is sharing real life, personalized information with tourists in order to optimize tourism experience (Boes et al., 2016). The term "smart" is rapidly being used to the tourism sector, which makes sense given that the tourism sector itself is tremendously information intensive and largely dependent on communication technology (Wang et al., 2020). Pai et al. (2020) describe that in addition to smart devices, other technologies belonging to STTs include social media platforms, cloud computing, big data, Internet of Things (IoT), artificial intelligence (AI), virtual reality (VR), and augmented reality (AR).

Information and Communication Technology (ICT),

ICTs are the reason smart cities could emerge and develop, since ICT enable innovations that make cities, whether already existent or newly constructed, smarter (Del Chiappa et al., 2015; Yang & Lam, 2021). Moreover, they actively contribute to a destination's marketing by igniting new technologies (which makes a place more attractive), new trends in tourism, also by improving sustainability, making the destination more accessible and last but not least opening new doors to visitor decision making, by the use of online distribution channels (Mandic and Garbin Praničević, 2019). When viewed as a driving force in smart cities, information and communication technologies (ICTs) enhance socioeconomic development toward digital urbanism (Yang & Lam, 2021). Applications built on ICT are aimed at improving the effectiveness of delivering different urban services and these innovative approaches are frequently supported in both the public and private sectors in order to foster a smart community (Yang & Lam, 2021).

Accessibility

An effective public transportation system is one of the main contributing factors to a effective smart city initiative, which is crucial to improve the quality of life of the residents of a smart city, and the quality of stay of a tourist of a smart tourism destination. An intelligent public transportation system is a requirement for a smart city, since travelers in crowded cities are having troubles due to an inadequate information system in the public transportation, and because they are unaware of the arrival time of an incoming bus or train, passengers are compelled to wait for a lengthy time. With the integration of technology into public transportation, a traveler may move around the destination with ease (Vakula & Raviteja, 2017). Lee et al. (2020) claim in their research paper that in order to help tourists plan itineraries, browse city information, and look up local transportation, the services provided by smart tourism cities must be helpful throughout the whole journey phase, moreover a smart tourism city needs the necessary physical infrastructure, technology, information database, and basic city circumstances to encourage the development of the tourism industry and most significantly, a smart tourism city offers guests smart transportation services. They also highlight that the aspects of a smart city, which is proper infrastructure, services provided to locals, and land area are merged with the aspects of smart tourism, which is smart transportation, attractions, and products such as accommodation, or gastronomical experiences (Lee et al., 2020).

Sutar et al. (2016) stress in their paper that a smart public transportation system, and smart information distribution regarding transportation is crucial in a city, because of problems such us: lack of knowledge on punctual scheduling, location of public transport stations, lack of information on the specific routes vehicles take. A Smart public transportation system (for example a user-friendly smartphone application) would solve these issues, with a map that shows real-time information on the whereabouts of public transportation vehicles, the proper schedule times, all the stations near your location, or the capacity of the buses. With these

applications a passenger is also able to plan their journey in advance (Sutar et al., 2016). While Sutar et al. only comes up with the example of buses in their paper I am able to declare with certainty that the problem is present in all forms of public transportation, including subways, trams, and so on. I can also state that these innovations would help both the sustainability of a smart tourism destination (by minimizing pollution) and the life of visitors, who are always very uncertain about transportation and the whereabouts of sights at a new destination. This would be beneficial for both groups.

Interactivity

When using STTs, interactivity is referred to as a facilitator that encourages passengers to provide real-time feedback and engage in active dialogue (Huang et al., 2017). This has an impact on how tourists react to STTs. When users of social media platforms perceive a high level of involvement, they are more likely to use the service and interact with travel vendors through their purchasing decisions, comments, and feedback (Tan et al., 2018).

Security

Security is the preservation of personal data when utilizing different forms of STTs. In locations where they feel their personal information is secure, tourists frequently utilize STTs. Security is seen as a key characteristic of perceived STTs in many earlier research (No and Kim, 2015).

Methodology

Study Area

Data for this research was collected through a questionnaire among international tourists visiting Budapest in Hungary. Budapest was chosen for particular reason. Firstly, Accordingly, Smart city index by Singapore University for Technology and Design, (SUTD) Budapest among the best smart tourism destination in Easter Europe countries. Secondly, Budapest has technologically smart transport facilities, security applications and smart parks for international tourists (Bulcsú et al., 2021).

Study design, sampling and data collection

This research sought to answer the following research question: This study assesses how tourists experience on use of STT, ICT, accessibility, interactivity, and security) at destinations. To answer this question, this study used a quantitative research design by survey method to collect primary data from international tourists who visited Budapest in Hungary. The survey questionnaire was designed into 2 sections: the first section dealt with demographic characteristics of the respondents. The second section dealt with study variables like ICT, accessibility, interactivity, and security. This scale was developed based on the finding of Fuad et al., 2020; Stela Cristina & Marlusa de Sevilha Gosling 2021. Data were collected between August and November 2022. A total of 300 international tourists filled the semi-structured questionnaire, consisting of open and closed ended questions. Out of these 256 questionnaires were completed and mistake free. The reply was voluntary and anonymous. Closed ended questions had a 5-point Likert scale, ranging from 1 = “not at all agree”, to 5 = strongly agree.

Results and discussion

To fulfil the objectives and answer the research questions for this study, data was collected, edited and coded, and then analyzed by using Statistical Package for Social Science (SPSS) version 25 for descriptive statistics and inferential statistics. Mean, standard deviation and ranking revealed the relationship tourists experience on use of STT.

Table 1: *Demographic Characteristics of the respondents*

Items		Frequency	Percentage
Gender	Male	145	56
	Female	111	44
Age	18-24	88	34
	25-34	100	40
	35-54	30	12
	55 and above	38	14
Highest education level	High school education	56	22
	University education	200	78
Respondents occupation	Entrepreneur	55	22
	Service industry Employee	100	39
	Student	68	27
	Unemployed/pensioners	33	12

Source: *Author own findings based on data*

According to descriptive analysis of respondents' demographic data there were more males (56%) than females (44%). The youngest respondent who filled the questionnaire was18 years old and the oldest was above 55 years old. Overall, 86% of the respondents where age of group between 18-55 years and the remaining 14% of the respondents were above 55 years and 78% of the total respondents had a university education. Among the respondents, 22% of respondents are entrepreneurs 39% of the respondents are worked in the service industry, 27% of the respondents are still studying their education and remining 12% are unemployed and pensioners. The demographic information of the sample is presented in Table 1.

Table 2: *Descriptive statistic of the variables*

Variable	Items	Mean	SD	Rank
Information and Communication Technology (ICT)	When traveling in Budapest, Smart Tourism Technology provides me with useful information about the travel destination and the trip.	3.61	1.118	2
	Learning to use and operate the Travel related ICT applications to start my travel plans is easy.	3.77	0.972	1
	The ICT is very effectiveness in searching for SMART tourism destinations	3.42	1.475	3
Accessibility	When traveling in Budapest, I can use Smart Tourism Technology everywhere	2.92	1.619	2
	When traveling in Budapest, I can search without a complicated sign-up process at tourism website.	2.35	1.934	3
	When traveling in Budapest, I can easily find Smart Tourism Technology	3.27	1.253	1
Interactivity	When traveling in Budapest, Smart Tourism Technology that I use is highly responsive to me	3.17	1.119	2
	When traveling in Budapest, it is easy to share tourism information content on Smart Tourism Technology	3.95	0.729	1
	When traveling in Budapest, I can find many other travelers' questions and answers on Smart Tourism Technology	2.52	2.109	3
Security	When I use Smart Tourism Technology, I believe my privacy is protected.	2.19	2.504	3
	When I use Smart Tourism Technology, I don't worry about collecting too much personal information Smart Tourism Technology Provides adequate security to protect my personal information.	3.19	1.199	1
	I believe Smart technology applications back up my personal data and use as a marketing strategy to promote the other products	2.74	1.862	2

Source: *Author own findings based on data*

Tourists perception about using Smart tourism Technology at Smart tourism destinations

There are four variables used in this study to find out tourist perception about usage of STT. The first variables ICT contains three items, among them, 'Learning to use and operate the Travel related ICT applications to start my travel plans is easy' item consider as a top ranked based on $\bar{x}$=3.77, SD=0.972. The second variable accessibility also contain three items, among them 'When traveling in Budapest, I can easily find Smart Tourism Technology' item consider as a top ranked based on $\bar{x}$=3.27, SD=1.253. the third variable Interactivity also contain three items, among them 'When traveling in Budapest, it is easy to share tourism information content on Smart Tourism Technology' item consider as a top ranked based on $\bar{x}$=3.95, SD=0.729. The last variable Security also contain three items, among them 'When I use Smart Tourism Technology, I don't worry about collecting too much personal information Smart Tourism Technology Provides adequate security to protect my personal information' item consider as a topic ranked based on $\bar{x}$=3.19, SD=1.199 (See Table 2.)

Conclusion

The results of the study provided theoretical implication on smart tourism and STT. The study adopted some variables of STT proposed by Chen-Kuo Pai and Huang Chen-Kuo (Pai et al., 2020; Huang et al., 2017). In other words, this study tries to identify the importance of usage of those four STT attributes ICT, accessibility, interactivity, and security) during visiting of smart tourism destinations. This study results showed that accessibility was the most effective contributor to tourist perceived STT experience in Budapest. The reasons tourists can easily use STT application like Budapest Go and Hungarian State Railways Magyar Államvasutak Zrt (MAV) to research destination at any time when they are highly accessible. With this easy access, tourists spend less effort on investigating transport facilities in Budapest. ICT was another influential variable to perceived STT experience in Budapest followed by accessibility. When tourism embracing STTs at smart destinations, tourists can easy find information on food and other activities at the destinations and tourists can have explore in Meetup and Facebook event pages to engage wide range of activities and event around Budapest. Moreover, tourist shows relatively low interest on interactivity in the context of STT experience. Lastly, security related issues when using STT tourists are relatively mediating results. Therefore, for tourists visiting Budapest, the ordinary technology used in tourism might not be effective since tourist pursued wonderful technology based travel and tourism experience.

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