THE RELATIONSHIP BETWEEN USING TOURIST MOBILE APPLICATIONS AND THE SATISFACTION OF YOUNG VISITORS OF A TOURIST DESTINATION

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Abstract
Purpose – The development of today's tourism is almost impossible to imagine without understanding the inclusion of technology. Not long after the emergence of the Internet, tourism began to take advantage of its benefits. This paper presents the attitudes of tourists on the importance of implementation of mobile applications before and during a visit to a tourist destination.
Therefore, the aim of the paper is to explore the extent to which young visitors use mobile applications during and after their trips and whether the use of mobile digital tools and services affects their satisfaction with their stay in the destination. Young visitors/students were taken as sample because of previous researches where there were respondents from more generations but young people were the most numerous.
Methodology – In order to explore the importance and participation of individual mobile applications in improving satisfaction in a tourist destination, a descriptive analysis of existing technological tools that help tourism to reach recognisability among potential and current visitors was carried out. The primary research was carried out by using a structured online questionnaire. By carrying out correlation analysis, the results were obtained, which applications participate most significantly in improving satisfaction when visiting a tourist destination.
Findings – The research in this paper indicated the attitudes on the importance of mobile applications in the future development of tourism and on the importance of digital technology in all segments of travel. In addition, the attitudes of the respondents regarding their thinking about the future possibilities of using technology for the benefit of tourism development were also highlighted.
Contribution – The theoretical, empirical, practical, and social contribution of this research should be taken into account in the design of a new tool for the adaptable and selective introduction of new mobile applications in the function of improving satisfaction with a tourist destination.
Keywords: tourism destinations, trends, mobile applications, young visitors.

INTRODUCTION

It is a known fact that more than half of humanity uses information and communication technology in different ways and for different purposes. Since tourism is an industry and visitors to tourist destinations are becoming more and more demanding, technology is a significant factor that can help the holders of the tourist offer in meeting these needs. Numerous trends are important for the specific development of tourism, both those related to the development of information and communication technology and those related to the habits and preferences of customers. For example, the trend of independent

travel organization, respectively the decrease in the importance of tourist package arrangements, as well as the increase in tourists' interest in personalized service. Namely, digital technologies enable users to relatively easily search, choose, book, and combine tourist services on their own and in accordance with their wishes. One of the roles of new information and communication technologies is to promote tourist offer and products that are presented to the user in a modern and accessible way. Such way of presentation makes the tourist destination more attractive, contributes to greater attractiveness and competitiveness on the market. As one of the specifics of the application of information and communication technology in tourism, Baird and Raghu (2015) state that it is important to take into account not only the user's satisfaction with the digital service provided, but also their satisfaction with the specific physical service which is contracted through digital channels, since research has shown that this level also has a significant impact on the overall perceived value of the digital service.

Some authors (Härting et al. 2018) point out that the digitalization process, which has been happening in recent decades, represents essentially the biggest social and economic change since the time of the industrial revolution. Such a perspective additionally indicates the depth and scope of the changes that are underway and which, as expected, will continue in the upcoming years. This paper indicated the attitudes on the importance of mobile applications in the future development in all segments of the tourist trip.

Therefore, this paper aims to contribute to the debate on tourism innovations, proposing a framework that assesses how mobile applications used in the destination can improve the tourist experience. In practical terms, such situational analyzes can also be useful for destination managers to design an adequate visitor's satisfaction management strategy at the destination.

From the above, several research objectives (RO) are imposed:
RO1 - Determine the correlation between total tourist satisfaction and the use of mobile apps.
RO2 – Identify which mobile applications are most dominant in the tourist experience of young visitors / tourists.
RO3 – Identify whether there are any possible negative circumstances in using mobile applications in function of tourist visit

The results of the research with the discussion and limitations, contribute to analysing which applications participate most significantly in improving satisfaction when visiting a tourist destination.

1. LITERATURE REVIEW

The literature review revealed the importance of using information and communication technology in tourist destinations, where the tourist experience is improved by using mobile technology in different moments and situations which arise from the travel. The competitiveness of a destination increases when there is an interaction between tourists and what the destination offers by using new technologies (Neuhofer et al. 2012). In this context, it is important to emphasize the revolution in mobile technology with the special

role of smartphones, which in numerous occasions serve as travel support (Wang, Pasrk, and Fesenmaier 2012). The possibilities and means of using technology in tourism are numerous and different. Tourists today do not travel without a smartphone, and some also carry tablets and laptops. The authors Rivera, Gregory, and Cobos (2016) pointed out in their paper that one out of five travellers carry three smart devices (mobile phone, laptop and tablet), and every fourth traveller carries two devices on their trip. They also stated that mobile technology, more specifically mobile apps, may soon become a key factor for sustaining the alliance between timeshare developers, management companies and consumers. The authors Wang, Pasrk, and Fesenmaier (2012) concluded that the choice of travellers before and during the trip is often influenced by the content of mobile applications about the tourist destination. Therefore, they point out that the use of smartphones significantly affects the choice of destination and the course of the trip. Since the answers in the research conducted for the purpose of this paper are often directed at different types of applications, below is the classification of mobile applications in tourism (Kennedy-Eden and Gretzel 2012). This classification was also used in the research conducted for the purpose of this paper:

1. Navigation applications
2. Social applications
3. Mobile Marketing
4. Security and Emergency applications
5. Transactional applications
6. Information applications
7. Entertainment applications.

Navigation applications are applications that help the visitor to navigate in an unknown area. They are way finding, Global Positioning System (GPS) and augmented reality. Social applications consist of social network applications and applications for communication. Mobile Marketing refers to applications through which it is possible to obtain, for example, various coupons. Security and Emergency applications consist of applications that provide the visitor with information about where to get help in different types of accidents, such as medical services and emergency information. In addition to the above, these applications include weather forecast applications. Speaking of transaction applications, they include shopping, auctions, financial/banking and tickets/reservations applications. Information applications include those applications that provide users with various types of information related to tourism, i.e., visiting a certain destination. The authors divide entertainment applications into several subcategories: games, videos/television, music, e-reader, photographs/editing, and fantasy sports.

A part of the mentioned mobile applications is those that are installed on the mobile device by the manufacturer, and others are those that the customer installs on his own device (Fling 2009).

As stated earlier in the paper, technology has drastically affected the development of tourism, and the authors Im and Hancer (2014) add that it is very important to monitor the behaviour of visitors, respectively, their habits on smartphones, in order to constantly adjust the offer and thus attract potential guest, but also satisfy the guest who is already in the destination. Authors Zhu and Morosan (2014) point out that the experience is of higher quality if mobile technology provides the guest with the required information or

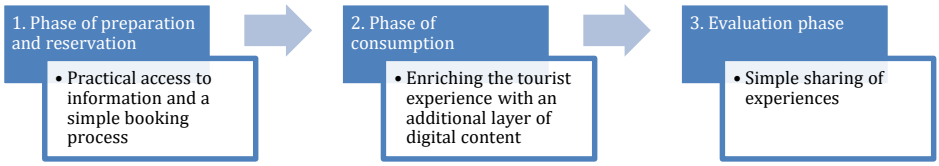
service quickly, simply, and accurately. The authors Buhalis and Amaranggana (2013; 2015) mention the visitor experience and the growth of the destination's competitiveness in the same sentence, thus linking the above, which confirms that a destination cannot progress without a positive visitor experience, and vice versa. The results of the research conducted for the purpose of this paper will explain the relationship between the use of mobile applications and the overall satisfaction of visitors or the improvement of their tourist experience.

The author Petrinić (2013) stated the significant role of information and information-communication technology in the development of tourism. Boes, Buhalis, and Inversini (2015), state that recently information and communication technologies are included in more complex situations within destinations and in this way improve the life of local residents and make their stay easier for visitors. The authors Ivars-Baidala et al. (2019) point out that the influence of information and communication technology in tourism is extremely strong. As advantages of using information and communication technology in tourism the author Mihajlović (2013) states easier and more pleasant business, lower investment and system maintenance costs, quick and easier availability of tourist offers (24 hours a day), accurate and reliable information about tourist services, easier purchase and safe payment of tourist services and the creation of a database of service users in order to further improve and promote the destination.

Tourism is among the first sectors that found itself in the process of digital transformation. According to characteristics of the tourist product make it very suitable for digitization and open up space for numerous added values that can be realized by applying modern digital technologies.

The areas of application of information and communication technology in tourism are truly numerous and encompass several stages of the tourist experience: from the stage of preparing a tourist trip, through digital insight into relevant information and reservations of various tourist services (stage 1), to eventually expand to the stage the consumption of tourist services themselves (2nd phase) and the phase after the tourist experience (3rd phase) (Beynon et al. 2014). Figure 1 shows the mentioned three phases of the tourist experience.

Figure 1: **Phases of application of information and communication technology in tourism**



Source: Created by the authors according to Beynon et al. (2014)

As can be seen from the Figure 1, the first stage of the tourist experience consists of enabling practical and simple access to information about the destination, accommodation, transportation, attractions and other tourist services, respectively as simple as possible selection and reservation of services and travel preparation. Specific digital tools are being developed to serve this, the second phase of the tourist experience, and with the further development of technologies, their increasing representation can be expected. Of course, the third phase of the tourist experience, respectively, the evaluation and sharing of impressions after the tourist experience, is of great importance. The results of that phase often act as a feedback loop for the previous phases, and are particularly useful for other tourists when planning tourist trips.

Dumičić et al. (2016) analysed data for a 12-year period, from 2003 to 2014, based on data from Eurostat and the World Bank. First of all, the analysis showed that in the observed period there was a significant increase in the percentage of the population that booked tourist accommodation online; namely, this percentage continuously grew from a level of around 5% in 2004 to a level of around 23% in 2014, whereby the presented percentages refer to the average of the observed European countries. Regarding the factors that influence the results in individual countries, these authors find that there is a positive influence of the percentage of GDP that the country spends on education and Internet penetration, on the increase in online reservations of tourist accommodation, while the percentage of the population with underdeveloped digital skills is negatively correlated with online reservations of tourist accommodation.

A bit later, in 2018, Žmuk and Mihajlović conducted another similar analysis, concluding that the developed digital skills of the population of a particular country have a strong positive influence on the percentage of online reservations of tourist accommodation, while GDP per capita has a slightly weaker, but still statistically significant positive influence. These authors also conducted a cluster analysis of European countries, finding that the developed countries of Northern and Western Europe are mostly grouped in the same clusters, unlike the countries of Southern and Eastern Europe, which are predominantly located in other clusters. According to this analysis, Croatia is in the cluster with the lowest average levels of all observed indicators, together with most of the other countries of Southeast Europe.

Further analysis based on Eurostat data was conducted by Ruiz Gomez et al. (2018). They developed and compared indices of integration of tourism and indices of integration of information and communication technology and consequently studied the relative position of each individual European country as well as the grouping of countries by similarity, where the results obtained were mostly analogous to those previously cited. Furthermore, the authors Marić and Zoroja (2019) analysed the trends of online reservations of tourist accommodation, which showed the continued growth of this type of reservations throughout Europe until 2017, which was the last year analysed in that paper. However, the same authors (2019) also conducted a survey of the habits of Croatian tourists, where the results indicated that almost all respondents (90%) use the Internet as the main source of information regarding the reservation of tourist accommodation, but a significantly smaller percentage of respondents (58%) stated that they actually complete the accommodation reservation online. The respondents stated that they most often use the following services: Booking.com (58%), Tripadvisor

(33.3%), Airbnb (27.2%), Trivago (22.2%), Hotels.com (8.6%) and Expedia (6%), where it should be borne in mind that both Trivago and Hotels.com are part of the Expedia group. The authors emphasize that the sample of their research was unrepresentative (81 respondent), respectively, they state that the presented results can only be viewed as an indication of possible trends.

The research of this paper aims to assess the importance of the implementation of mobile applications in the satisfaction and experience of tourists, visitors in a tourist destination.

The following research hypotheses were set:
H1: Mobile applications used before the trip is in the positive relationship with the dimension of the user experience.
H2: Mobile applications used during the trip is in the positive relationship with the dimension of the user experience.

Below are the results of the research conducted for the purpose of this paper.

2. RESEARCH RESULTS

In January 2023, a survey was conducted on a sample of 112 respondents between the ages of 19 and 24 (born between 1999 and 2004). The survey questionnaire was used as an online data collection method and was compiled very concisely and simply for the sake of efficiency and speed of its implementation.

The structure of the questionnaire enabled the collection of data based on the independent variables, which represent the degree of usefulness (contribution) of using individual mobile applications according to the overall degree of satisfaction with the visit, which represents the dependent variable. Respondents (young visitors) assessed the usefulness of individual mobile applications (the classification of 7 groups of mobile applications in tourism according to Kennedy-Eden and Gretzel 2012 was previously mentioned) and their correlation with visiting a tourist destination.

In conducting the survey, the method of directed sampling was used, in which the selection of the sample is based on some criterion, in this case on a sample of visitors who are between 19 and 24 years of age (born between 1999 and 2004) and who use mobile applications when visiting a tourist destination. It is limitation of this study, that there were in the sample only young generations and only five of them. So, it would be recommendation for the future researches, to include more than five young generations, as well as to include older visitors.

In data processing and analysis, to achieve the research goals, the method of description, correlation (Pearson's coefficient) was applied, in which individual applications represented independent variables and the total level of visitor satisfaction represented the dependent variable.

Among the respondents, 57% were female and 43% male. When asked whether they travelled individually or organized by a travel agency or other organizer, they all

answered that they travelled individually. The vast majority of them (94%) travelled to a destination they had not visited before, and 6% of them visited the same destination for the second or third time. As the reason they stated visiting friends/relatives. Therefore, they did not use commercial accommodation in the destination. Of the other respondents, 73% booked their accommodation through the Booking.com site, 23% through the Airbnb site, and 4% of them received a recommendation for an apartment from a friend and booked their accommodation directly with the owner without using digital reservation channels. As many as 95% of the respondents stayed in an apartment/studio apartment, 3% stayed in a hostel, and 2% in a lower-category hotel. It can be concluded that the majority of respondents booked accommodation in the destination through online booking channels (96%) and considering that they belong to the younger population, most of them stayed in more affordable private accommodation. As for Booking.com and Airbnb are concerned, 95% of them have both applications installed, while the rest use their websites. The 6% of respondents who were visiting friends/relatives travelled alone or accompanied by a partner/family. Of the other respondents, 4% travelled alone, 83% in the company of a partner or a friend, and 13% in the company of no more than 4 people.

All of the above information are provided in the next table.

Table 1: **Sample characteristics**

Questions	Answers (in %)			
Gender	Male - 43	Female – 57		
Organization of travel	Individually – 100	Organized by travel agency - none		
Travelled to first time destination	Yes – 9	No – 6 – visited friends and family		
Booking of accommodation	Booking.com – 73	Airbnb – 23	By recommendation – 4	
Accommodation type	Apartment/studio apartment – 95	Hostel – 3	Lower-category hotel – 2	
Have accommodation mobile applications	Yes – 95	No – 5		
Travel company	Those who visited friends and family → Alone/accompanied by a partner/family – 6	Alone – 4	In the company of a partner/friend – 83	In the company of no more than 4 people

Source: Authors

The next part of the questionnaire consisted of several questions regarding the daily use of mobile technology. The results will be presented in the form of a table for clarity.

Table 2: **Daily habits of using mobile technology**

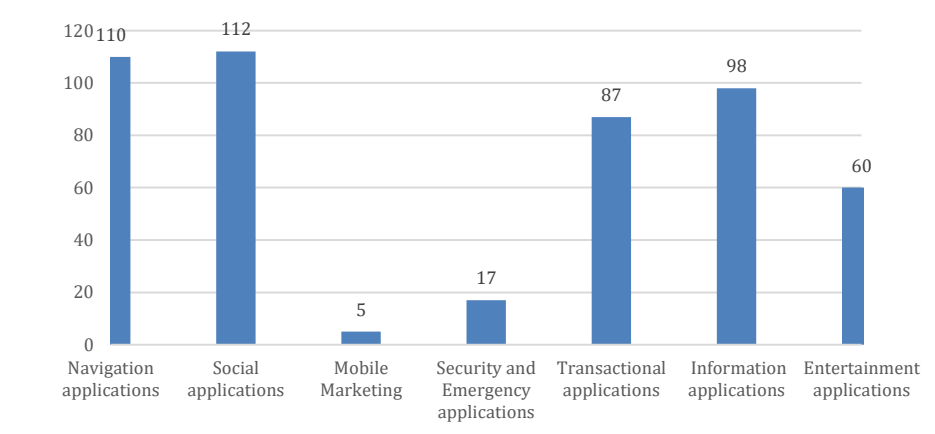
Questions	YES (in %)	NO (in %)
Do you own a smartphone?	100	
Do you own a laptop?	100	
Do you use mobile messaging apps?	100	
Do you use mobile social networking apps?	98	2
Do you use mobile applications for online shopping?	87.5	12.5
Do you also use other mobile applications when you are not traveling, that is (almost) daily?	100	
What are these mobile applications?	Internet banking; Photo editing; Loyalty cards; Google Maps; Weather forecast; Game applications; News applications; Health apps…	

Source: Authors

The next question referred to travel planning, where it was possible to tick more than one answer. All respondents answered that they used web services when planning their trip. As many as 94% of respondents used web services to book accommodation (previously it was pointed out that 6% of respondents were visiting relatives or friends). 87.5% of them used mobile applications for viewing attractions, and 61% for viewing restaurants. 67% viewed the profile of the destination on social networks, and 37% of the respondents used the destination's website (websites of tourist boards).

The next question referred to the types of applications that the respondents used during their last trip. The respondents' answers are shown in the following graph.

Graph 1: **What mobile apps did you use during your last trip?**



Source: Authors

Most of the respondents used social networks and navigation applications. Then follow Information application, transaction applications and entertainment applications, and the least used were Mobile Marketing applications and Security and Emergency applications. It is interesting to note that as many as 51% of the respondents installed an application during their trip that was useful to them in order to make their stay simpler and better. In doing so, they most often installed parking applications, museum applications and other attractions applications.

In the second part of the questionnaire, with the use of Likert scale the respondents evaluated whether the mobile applications they used before and during their last trip increased their satisfaction. None of the respondents chose ratings 1 and 2, 40% of them answered that they neither agree nor disagree, 25% of them answered that they agreed, and 35% answered that they completely agreed. From the above, it can be concluded that 60% of the respondents who participated in the research are satisfied with their trip due to the use of mobile applications. The results of the conducted research confirmed the hypothesis.

In order to determine the correlation (connection) between overall satisfaction when visiting a tourist destination and the use of mobile applications available to them, the respondents evaluated the mobile applications they use most often. In the next step, the correlations between the mentioned predictor variables (individual mobile applications according to Kennedy-Eden and Gretzel 2012) and the criterion variable (overall satisfaction with the destination) were examined (Tabachnick and Fidell 2007).

Table 3 shows the results of descriptive statistics and the correlation matrix of the observed variables included in the model.

Table 3: **Descriptive statistics and correlation matrix of observed variables**

Variables	N	M	SD	TE	**TA**	**SA**	**NA**	**EA**	**EnA**
Total experience	112	3.132	.4658	-					
Transactional applications	112	3.356	.9069	.471*	-				
Social applications	112	3.284	.5143	.737***	.455*	-			
Navigation applications	112	2.924	.8434	.778***	.834***	.686***	-		
Emergency applications	112	3.212	.4135	.454*	.686***	.449*	.578**	-	
Entertainment applications	112	2.823	.4540	.513*	.558**	.496*	.501*	.548*	-

Note: Statistical significance: *p < 0,05; **p < 0,01; ***p < 0,001

According to the indicators in Table 3, all correlations between the overall satisfaction (experience) of visiting a destination (TE) on one side and the use of individual mobile applications are moderate to high, ranging between r = .453, p <. 05 and r = .778, p < 0.001. It is also visible that mobile applications: Navigation applications (r = .778, p < 0.001) and Social applications (r = .737, p < 0.001) show a significantly higher

correlation with the total level of satisfaction (Total experience) compared to other used mobile applications - Transactional applications (TA), Social applications (SA), Navigation applications (NA), Emergency applications (EA), Entertainment applications (EnA). Analysing briefly, this can lead to the conclusion that they are more necessary for young visitors (users) in terms of their content, usefulness, practicality and credibility compared to other observed applications. All predictor variables (use of mobile applications) are statistically related to the degree of visitor satisfaction, with the fact that this relationship is more pronounced in the case of the use of applications: Social applications and Navigation applications.

CONCLUSION

Tourism is a system that inevitably tracks technological progress, especially in the domain of availability and attractiveness of all elements of the tourist product of the destination. New tools and platforms have appeared through which visitors can book accommodation as well as applications that are used during their stay in the destination. The aim of the research in this paper was to assess the importance of the *implementation of mobile applications in the satisfaction and experience* young visitors, and to investigate the contribution of the use of *mobile applications* (independent variable) to the overall *degree of satisfaction with the visit* (dependent variable) by using the method of description and correlation (Pearson's coefficient).

The research was conducted on a sample of 112 respondents of young age. Everyone organized their trip independently and mostly visited the destination for the first time. It can be concluded that the vast majority of respondents booked accommodation in the destination through online booking channels (96%) and considering that they belong to the younger population, most of them stayed in private accommodation. Even 95% of them have mobile applications for booking accommodation installed on their smartphones. The vast majority of them travel with their partners or friends.

All respondents own a smartphone and a laptop and use mobile applications for correspondence. Most of them use mobile applications of social networks and somewhat less mobile applications for online shopping. And in their daily life (when they are not traveling) they use other mobile applications, most often Internet banking, photo editing applications, loyalty cards, *Google Maps*, weather forecast, game applications, news, health.

As stated in the paper, for the research of this paper there was inspiration in the papers of authors Buhalis and Amaranggana (2013; 2015) whose papers confirms that a destination cannot develop without a positive visitor experience. Their results of the research conducted for the purpose of this paper where is explained the relationship between the use of mobile applications and the overall satisfaction of visitors or the improvement of their tourist experience.

When planning their trip, all respondents used web services, mainly for booking accommodation (94%), mobile applications for viewing attractions (87.5%), for viewing restaurants (61%), and destination websites on social networks (67%).

During their last trip, most of the respondents used applications for navigation and social networks, as well as transactional and entertainment applications and the least used were Mobile Marketing applications and Security and Emergency applications. It is interesting to note that as many as 51% of the respondents installed an application that was useful to them during their trip, most often an application for parking, applications for museums and other attractions. As many as 60% of the respondents who participated in the research are satisfied with their trip due to the use of mobile applications, which confirms hypothesis, as well as before specified results: *H1: Mobile applications used before the trip is in the positive relationship with the dimension of the user experience and H2: Mobile applications used during the trip is in the positive relationship with the dimension of the user experience*. The research also showed that all predictor variables (use of mobile applications) are statistically related to the degree of visitor satisfaction, with the fact that this relationship is more pronounced in the case of the use of applications: Social applications and Navigation applications.

This way of creating an experience in the destination implies that technology is included in all segments of the tourist trip. The further development of tourism will be affected by the introduction of new technologies, such as artificial intelligence, machine learning, the Internet of Everything, specific technologies such as virtual reality and augmented reality, which in the future could affect another wave of digital transformation in this sector.

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