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TRANSPORT BEHAVIOUR, PERCEIVED EXPERIENCE AND SMART TECHNOLOGY USAGE OF TOURIST DESTINATION VISITORS[1]

Abstract

With the purpose of establishing differences in behaviour of tourist destination visitors this paper aims to identify their habits, attitudes and activities with regard to transport modalities used on a daily basis, during the trip to the destination, and while staying in the destination, highlighting the aspect of smart technology usage. The results of this study are part of a more extensive research on the behaviour of tourist destination visitors, conducted as part of the Project Cekom – Competence Center for Smart Cities, whereby the research tools and methods were built on the ETIS (European Tourism Indicators System) methodology. Approximately seven hundred visitors of the Primorje-Gorski Kotar County, which was taken as a case

study, were included in the research. The study showed that accessibility was one of the key factors in destination choice for the respondents, and that their everyday transport behaviour patterns differ somewhat from their behaviour pattern when travelling and vacationing. Statistically significant differences were determined in the perceived experience of different groups of destination visitors', as well as in the frequency of use of smart technologies among groups of visitors with different transport behaviour. One of the research limitations with regard to generalization of conclusions is research focus on a specific destination area, as well as the pre-defined structure of the research sample, which is in line with the requirements of the funding EU project. Differences in transportation behaviour among groups of respondents in general, and in relation to the use of smart technologies, should be verified on a larger sample, in other destination areas. Acknowledging the behavioural aspects, i.e. the differences in the transport behaviour and smart technologies usage has social and practical implications for destinations, in the context of the changed dynamics in the relationships and roles of stakeholders on the tourism market.

Keywords: transport behaviour, destination visitors, travel satisfaction, quality of transport services, smart technology usage

1.   INTRODUCTION

Nowadays countries strive for smartness in the form of smart cities and smart solutions in daily life. Tourism countries like Croatia additionally strive for smart tourism. Indirectly, this is also the goal of the project *Cekom*, within the framework of which the primary research for this paper was conducted.

The objective of this paper is to identify the determinants of travel behaviour of visitors to destinations and to establish a relationship between travel behaviour and technology use among groups with different travel patterns. In order to determine destination visitors' travel behaviour and perceptions of various aspects of travel, this paper relies on a survey of destination visitors about various aspects of their travel, based on some previous research and surveys attributed to them. The same approach is applied to the study of the frequency of certain forms of technology use by visitors to destinations during their trip, focusing on the single aspect of user-generated content on social media.

It is argued that by using smart technologies, tourists gain "access" to attractions and information needed for their activities (Jeong and Shin, 2019), but smart technology use is seldom considered by destination stakeholders responsible for sustainable tourism development. The same is true for transportation behaviour (Sorupia, 2005). Smart tourism technologies (STTs) are multidimensional concepts characterized by the degree of accessibility, informativeness, interactivity, and personalization (Azis, et al., 2020; Huang, et al., 2017; Jeong & Shin, 2019). STTs are particular online tourism applications, specific tools, information sources, and/or smart tourism systems, such as decision support systems, ambient intelligence, mobile-connected devices, beacons, virtual reality (VR), augmented

reality (AR), mobile apps, integrated payment methods, smart cards, cloud computing and radio-frequency identification (RFID), online travel agents, personal blogs, websites, social media, smartphones, etc. (Gretzel, et al., 2015a; Gretzel, et al., 2015b; Huang, et al., 2017; Jeong & Shin, 2019), that are expected to inform the decision-making process on both the supply and demand sides of the tourism market and lead to added value, i.e., better quality of overall travel experiences, satisfaction, and destination loyalty (Cimbaljević, et al, 2021; Femenia-Serra, et al., 2019; Jeong & Shin, 2019), based on the improvement of key attributes of STTs. Those attributes are primarily accessibility and informativeness, according to Azis, et al. (2020), or informativeness, interactivity, and personalization according to (Jeong & Shin, 2019).

This paper focuses on the transportation behaviour of tourists and highlights its relationship with the use of smart technologies during vacation. The analysis of the relationship between the general behavioural aspects associated with smart technologies and the perception of destination traffic quality is not detected in the existing studies, except for one (Kovačić, 2022). Therefore, this research is trying to fill the gap by identifying the patterns in two key aspects of visitor behaviour from the perspective of tourism authorities and, more importantly, by establishing a link between these two dimensions. The idea is to develop some practical managerial implications while theoretically destination managers could prioritise some smart technology implementations for travel and other tourism activities in a destination if they have good arguments (based on research) as well as feedback (based on user-generated content data).

Destination space is specific in terms of managing people flows, as well as the overall heterogenic demand of transportation systems. Although it can have a negative impact, transportation is an indispensable part of the overall tourism experience. The use of new technologies in destinations holds great potential to improve transportation (Tan & Ismail, 2019) as well as satisfaction with smart tourism destinations (Um & Chung, 2021) by enhancing the tourist experience (Ghaderi, et al., 2019) or negatively influencing the perception of the received value (Kelly & Lawlor, 2021). For this reason, there is a need to study the behaviour and attitudes of transportation systems users, and this paper attempts to contribute to the identified gap in existing studies on the visitors' transportation behaviour and achieve the following specific objectives:

- Identify the transportation behaviour of tourist destination visitors in terms of the modes of transportation used every day, while travelling to the destination, and while staying at the destination;

- Identify the frequency of different behaviours related to the use of smart technologies (uploading content, posting opinions and preference-related data online) among destination visitors of different transportation behaviour.

The concepts of smartness in tourism (smart tourism, smart destination, or smart tourists) are not the focus of this paper, but are necessarily considered due to the scope and objectives of the research. This paper focuses on transportation

behaviour and considers the use of smart technologies as part of a broader behaviour of visitors to a destination.

The approach of this paper is in line with the approach of the broad market research funded by the same source (*Cekom* project) and therefore implies the same methodology and minor similarities as one existing study (Kovačić, 2022). Nevertheless, the results presented in this paper highlight the frequency of certain smart technology use behaviours (and focuses on user-generated content activities) and substantially differ from the paper of Kovačić (2022) focused on willingness to use individual forms of smart technologies and to engage in a different set of smart technology behaviours.

2.   THEORETICAL CONTEXT

Technologies are an indispensable part of tourism and travel, and while ongoing development is constantly expanding the list of online applications and information sources, i.e., the STTs (e.g. Azis, et al., 2020; Gretzel, et al., 2015a; Gretzel, et al., 2015b; Huang, et al., 2017), many STTs are being implemented in managing destination systems (Kooa, et al., 2016), transportation system included. Smart city services are beneficial to tourists during their stay (Um and Chung, 2019), but local communities also benefit from improvements made for (smart) tourists.

In line with the concept of tourist destinations as ecosystems (Boes, et al., 2016; Gretzel, et al., 2015b; Um & Chung, 2021), which are ICT-based and require socio-technical relationships (Meijer & Bolı'var, 2015; Boes, et al., 2015; Boes, et al., 2016), destination visitor STT use is a critical factor in co-creating the expected experiences that lead to tourist satisfaction (Buhalis, 2019; Buhalis & Foerste, 2015; Buonincontri & Micera, 2016; da Costa Liberato, et al., 2018; Femenia-Serra, et al., 2019; Ghaderi, et al., 2019; Kelly & Lawlor, 2021; Um & Chung, 2021). In some cases, it is the smart technologies that serve either as an attraction (Azis, et al., 2020) or as a tool to relieve tourists of travel concerns or anxiety (Goo, et al., 2022). Building smart experiences in destinations requires mitigating visitors' trust and control issues around data sharing and smart technology use (Femenia-Serra, et al., 2019).

The use of technology is often influenced by the intrinsic characteristics of tourists, but their experiences are influenced by the characteristics of the destination and trip (Fermenia-Serra & Ivars Baidal, 2018). The use of STTs and user-generated content enables timely and adequate communication between destination stakeholders and destination visitors, access to relevant travel information, personalization of the offer based on the preference data of incoming tourists, and facilitation of access and movement of destination visitors when in destination, and receiving valuable feedback about their experience. A negative experience with STTs may result in a tourist deciding not to visit the destination again or recommend it (Azis, et al., 2020).

The transportation at the destination may also be a negative experience due to many reasons (like heavy traffic, long travel times, high travel costs, noise, etc.), most of which can be managed with the appropriate application of ICT, i.e., a range of simple to sophisticated technologies, although not all mobility solutions are smart and based on ICT (Benevolo, et al., 2016). Smart mobility is a user- and action-oriented concept defined by vehicle technology, ITS, data, and new mobility services (Jeekel, 2017) and is usually considered as part of the smart city framework. Smart mobility policies aim to improve the efficiency, effectiveness and environmental sustainability of cities (Benevolo, et al., 2016) and therefore require a coordinated approach.

There are many studies on travel and mobility patterns, but most of them focus on urban residents (Alessandretti, et al., 2018; Pappalardo, et al., 2015; Wu, et al., 2019; Xu, et al., 2016; Jiang, et al., 2017; Xu, et al., 2018; Xu, et al., 2019; Yihong & Raubal, 2016). Promoting modal shift in tourists' travel behaviour requires various strategies (Truong, 2019). In the case of Mediterranean countries research suggests adopting smart and sustainable mobility strategies (like promotion of soft mobility/ sharing mobility/e-mobility; improvement of public transportation; implementation of low-speed areas; pedestrian crossings of major axes (subways / overpasses); ICT logistics innovations; implementation of info-mobility services; mobile apps; electronic ticketing, etc.) to improve accessibility while avoiding the negatives of traffic (Battarraa & Mazzeo, 2021). Although some studies investigate the role of different mobility options in tourist destinations (Šoštarić, et al., 2014), only a small number of studies (Čolić, et al., 2022; Miletić, et al, 2017; Mrnjavac & Slavić, 2018; Slavić & Horvat, 2020; Slavić & Mrnjavac, 2019; Slavić, et al, 2020) focus on the behavioural aspects in the context of actual transport systems in Croatian cities.

A better understanding of tourist travel behaviour is essential for strategic planning or decision making in tourist destinations, but although there is increasing interest in research on tourist mobility, the behavioural aspects researched are diverse, the samples are small, or the research focuses on a limited geographic area (Grinberger, et al., 2014; McKercher, et al., 2012; Yang, et al., 2017). Nevertheless, new technologies have enabled a shift in research approaches to study mobility patterns from resource-intensive surveys and questionnaires to the use of tools such as GPS (De Cantis, et al., 2016; Grinberger, et al., 2014), mobile tracking (Raun, et al., 2016; Saluveer, et al., 2020; Xu, et al., 2015), and geocoded social media (Kim, et al., 2019; Vu, et al., 2015; Xu, et al., 2021). As with the other methods of collecting data on visitor mobility behaviour, the aforementioned methods have the same purpose but are easier to apply to larger samples and larger geographic areas.

As indicated earlier, tourists' behaviour might also be determined through their social media content (Liu, et al., 2014). User-generated content, like photo-sharing services and geotagged photos, is an efficient data collection method to understand tourists' travel behaviour (Domènech, et al., 2020; Vu, et al., 2015; Yang, et al., 2017), and has been used in different ways (Paldino, et al., 2015; Sun, et al., 2015; Yang, et al., 2017). Big Data analytics also supports the prediction of

tourist travel behaviour (Padmaja & Sudha, 2019). In smart destination ecosystems (Boes, et al., 2016; Gretzel, et al., 2015b; Um & Chung, 2021), smart technologies are at the core of destination competitiveness and a critical factor in destination management activities (Kooa, et al., 2016). Therefore, it could be argued that monitoring the use of social media by visitors to destinations (or STTs in general) could support destination management planning and decision-making processes and increase visitor satisfaction with the tourism experience gained. The research presented in this paper provides insight into the travel-related behaviour of visitors to tourist destinations, with a focus on the frequency of certain forms of smart behaviour, i.e. user-generated contents.

3.   RESEARCH METHODOLOGY

With some limitations, this study fulfils the purpose of identifying destination visitors' travel behaviour and highlighting the aspect of smart technology use by focusing on tourists' activities related to online content creation, the approach recognised in previous research on tourists' travel behaviour.

3.1.   Research approach, methods and sample

A questionnaire based on *European Tourism Indicators System* for sustainable destination management surveys (*Visitor survey*) (European Commission, n.d.), was used to collect respondents' views on their behaviour using the personal interviewing method (i.e., CAPI, Computer-assisted personal interviewing). The questionnaire was supplemented with questions about respondents' daily mobility and tourism travel, which are the focus of this paper, taken from the Eurobarometer *'Quality of Transport'* (TNS Opinion & Social Network, 2014). Questions on the use of smart technologies were also added to the questionnaire, mainly from the work of Femenia-Serra, et al. (2019), as well as the *Survey on Attitudes and Expenditure of Tourists in Croatia* (Institute for Tourism, 2020). The latter also served as the basis for several survey questions on tourism consumption and destination choice factors.

This paper is based on 10 general and 6 sociodemographic survey questions. These questions were taken from a much wider research done with the aim of developing the *Data-Driven Destination Management System* (DDDMS), which is the final outcome of the authors' participation in the aforementioned *Cekom* project. The entire research was conducted in three stages - the first focusing on tourism authorities and destination service providers, the second focusing on visitors to the destination and local population, and the third focusing on tourism authorities piloting the DDDMS.

Most of the questions used in this paper were structured, while a Likert scale was used for the questions that measured satisfaction and agreement with a particular statement, as it allows the responses obtained to be treated as interval

scales (Marušić, et al., 2019, p. 201). The method of cross-tabulation has been used to quantitatively analyse the relationship between variables in survey responses in order to compare data sets and discover relationships between individual items (Pollfish, 2022; Qualtrics.xm, 2022). More specifically, it was applied to correlate the frequency of respondents' use of smart technologies with their transportation behaviour. To avoid multicolinearity, the correlation between variables was tested in advance. For the analysis of the overall results of the survey, the t-test and chi-square methods were used depending on the type of question, i.e. the type of variables.

Respondents were not explained what smart technology was, nor did the authors assume that respondents knew. "Smart technology" as a term was not mentioned. In determining general tourist behaviour while travelling and staying in a destination, questions related to smart technology were based on several specific statements where respondents were asked to indicate their level of agreement with statements about the use of individual forms of STTs or the frequency of such behaviour. The latter is presented in this paper.

The survey was conducted in the area of Primorje-Gorski Kotar County in the period from July 10 to September 11, 2021. A total of 707 overnight and day trip visitors were surveyed. The structure of the sample was specified by project *Cekom* –determinants, and is therefore based on opportunity sampling (quota sampling) (Marušić, et al., 2019). Criteria for sample distribution included the following:

- number of overnight stays in the reference year 2019, broken down by sub-region: 53% of respondents in the Kvarner islands, 45% in the coastal regions and 2% in Gorski Kotar;

- approx. equal ratio of foreign (50%) and domestic tourists (50%);

- the ratio of overnight visitors (tourists) - 60%, and day-trippers (40%).

About half of the respondents (54%) were male, most aged 35-44 (25%), 25-34 (20%), and 45-54 (17%). Most have a university or higher degree (41%) or a secondary school degree (35%) and are either employed full-time (68%), students (10%) or retired (10%), or employed part-time (7%). The majority travel with their spouse or partner (68%), followed by family members of varying ages (34% total) or alone (18%). The monthly income of the respondents is up to EUR 3,000.00 for the majority (62%), but one out of four respondents chose not to answer.

3.2.   Hypotheses

In light of the previously stated research purpose and objectives and the identified gap in research on visitor travel behaviour, the following hypothesis was formulated to relate tourist travel behaviour and smart technology use during travel:

H0: *there are no statistically significant differences in smart technology-related behaviour among groups of destination visitors with different travel experience perception (different levels of satisfaction with transportation services -*

determined by visitors' socioeconomic factors and mobility pattern determinants) and specific transportation behaviours (corresponding to primary mode choice).

The research sought to confirm the null hypothesis through several auxiliary hypotheses:

H1: *there are no statistically significant differences in the frequency of smart technology use during vacation with regard to the primary mode of transportation used to reach the destination*;

H2: *there are no statistically significant differences in the frequency of smart technology use during vacation, with regard to satisfaction with various aspects of transportation – travel safety, amenities for passengers, value for money and travel duration*;

H3: *there are no statistically significant differences in the frequency of smart technology use during vacation, with regard to the perceived quality of transportation services in different transportation sectors*.

The testing of the hypotheses is described in section 4.2.

3.3.   Research limitations

The disadvantages of opportunity quota sampling are recognized by this study, but its characteristics make it appropriate for this research. The generalisation of the conclusions is only possible for the specific destination area studied and can only be considered indicative for the whole country and the other tourism regions, while the transport behaviour in general and in relation to the use of smart technologies should be verified on a larger sample, including respondents from other destinations. Where possible, research results are compared to the existing data on a national scale to minimize the effect of this limitation – in *Conclusion and Discussion* section.

4.   RESEARCH RESULTS

The transportation behaviour of the respondents is identified under the following sections. The emphasis of this paper is on behavioural aspects related to the use of smart technologies, and the associated research results are presented in terms of the frequency of smart technologies use during tourism travel. When interpreting the research results, it is important to consider the interpretation key in Figure 1.

Statistical significance compared to total

Smaller than total		Larger than total	
XY	99%	XY	99%
XY	95%	XY	95%

Figure 1 Data interpretation key

Source: Project Cekom: market research report

Hypothesis testing relates to the following primary research findings, and discussion of their validation is part of the *Conclusions and discussion* section.

4.1. Transportation behaviour and perceived transportation experience of surveyed destination visitors

The average distance travelled to the destination by the respondents is 384 km. At the sample level (N=707), the accessibility of the destination was the third-in-line factor in destination choice.

Table 1

The main characteristics of the destination area that made the respondents want to visit it, according to visitor determinants (%)

	Total	Gender		Age						Origin		Type of visit		Destination subregion		
		Male	Female	16-24	25-34	35-44	45-54	55-64	65+	foreign	resident	day trip	overnight	coast	island	mountain
N	*707*	*381*	*326*	*111*	*144*	*177*	*120*	*93*	*60*	*356*	*351*	*282*	*425*	*315*	*376*	*16*
Beach facilities	62	58.5	66	58.6	65.3	62.1	56.7	64.5	65	64.9	59	55	66.6	53.3	71.5	6.3
Accessibility	34.2	30.7	38.3	30.6	32.6	34.5	37.5	34.4	38.3	27.2	41.3	33.3	34.8	25.1	41.2	50
Historical sites	5.8	5.2	6.4	2.7	2.8	4.5	4.2	10.8	16.7	8.7	2.8	4.3	6.8	8.3	4	
Peace and quiet	27.4	27	27.9	12.6	19.4	26.6	29.2	41.9	51.7	33.1	21.7	18.1	33.6	22.9	31.6	18.8
Health effects	21.8	22.8	20.6	2.7	6.9	18.6	30.8	45.2	48.3	27	16.5	16	25.6	16.5	26.1	25
Sporting facilities	7.2	8.1	6.1	8.1	10.4	7.9	8.3	1.1	3.3	7	7.4	6.4	7.8	7	7.7	
Entertainment and recreation facilities	20.8	22.3	19	32.4	26.4	20.9	20	9.7	5	19.4	22.2	22	20	23.2	19.4	6.3
Gastronomy	19.8	21.8	17.5	7.2	17.4	22.6	20	28	28.3	25.6	14	14.2	23.5	19	20.5	18.8
Quality of accommodation	17.1	19.7	14.1	5.4	14.6	15.8	22.5	18.3	35	25.6	8.5	1.8	27.3	12.1	21.5	12.5
Scenery and countryside	40.9	38.8	43.3	31.5	37.5	41.2	41.7	49.5	48.3	46.6	35	33	46.1	34	46	56.3
Particular activities	3.5	3.9	3.1	4.5	4.9	3.4	1.7	3.2	3.3	2.2	4.8	5.7	2.1	5.1	1.9	12.5
Particular event	1.6	2.9		1.8	2.8		2.5	1.1	1.7		3.1	3.5	0.2	2.5	0.8	
Friendliness and hospitality of locals	22.6	27	17.5	13.5	12.5	23.7	32.5	30.1	30	25.6	19.7	18.8	25.2	13.7	29.3	43.8
Other	3.5	2.9	4.3	3.6	2.1	4	3.3	5.4	3.3	3.1	4	3.5	3.5	2.9	4	6.3

Source: author contribution

There are no statistically significant differences between respondents based on age groups, gender, or type of visit, but accessibility is found more important (sig. 95%) to domestic tourists (41%) than to foreign tourists (27%). It is also more important to visitors to island destinations (41.2%) and less important to tourists travelling to the region's coastal area (25.1%).

Local transportation accounts for approximately 4% of tourist spending (which amounted to EUR 1,774 on average) in the destination for tourists, and 11% for day-trippers (who spent EUR 347.50 on average), as shown in Table 2.

Table 2

Specification of total visitors' spending in a destination, by category (%)

	Total	Gender		Age						Origin	
		Male	Female	16-24	25-34	35-44	45-54	55-64	65+	foreign	resident
overnight (61% of target population)											
N	*430*	*222*	*208*	*49*	*80*	*121*	*81*	*56*	*42*	*307*	*123*
sig		0,59		0,53						0,09	
Accommodation	59.5	60.4	58.7	42.9	52.5	59.5	67.9	67.9	64.3	61.2	55.3
Transport within destination	**3.7**	3.6	3.8	2	6.3	5		5.4	2.4	3.3	4.9
Food and drinks	26.3	27.5	25	38.8	30	28.9	21	21.4	14.3	23.5	33.3
Shopping and entertainment	10.5	8.6	12.5	16.3	11.3	6.6	11.1	5.4	19	12.1	6.5
day trippers (39% of target population)											
N	*277*	*159*	*118*	*62*	*64*	*56*	*39*	*37*	*18*	*49*	*228*
sig		0.99		0.54						0	
Transport within destination	**10.5**	10.7	10.2	6.5	6.3	3.6	25.6	18.9	11.1	8.2	11
Food and drinks	74.4	74.2	74.6	75.8	84.4	75	64.1	62.2	77.8	53.1	78.9
Shopping and entertainment	15.2	15.1	15.3	17.7	9.4	21.4	10.3	18.9	11.1	38.8	10.1

Source: author contribution

On a typical day in their place of residence, the primary and most often used mode of transport among the respondents is a *car* (37%), followed by *walking* (35%), and *urban public transport* (14%) - Table 3. The car is also the primary mode used to travel to a destination (72%), followed by *bus* (12%), and motorcycle (5%) – Table 4.

Table 3

The primary mode of transport used in the place of residence (%)*

	Total	Age						Origin		Type of visit		Destination subregion			Education				Household monthly income					
		16-24	25-34	35-44	45-54	55-64	65+	foreign	resident	day trip	overnight	coast	island	mountain	secondary or less	college	university or higher	prefer not to say	up to 500 €	501 - 1 000 €	1 000 - 2 000 €	2 000 - 3 000 €	3 000 € and more	prefer not to say
N	707	111	144	177	120	93	60	356	351	282	425	315	376	16	247	147	289	24	94	141	136	72	89	175
sig		0.96						0		0		0			0.01				0.01					
Car	37.3	25.2	34.7	40.7	43.3	40.9	40	43.5	31.1	35.1	38.8	47.3	29.3	31.3	32	46.9	37.4	33.3	30.9	44.7	36.8	48.6	42.7	28
Urban PT	13.7	18.9	11.8	11.3	15.8	15.1	8.3	13.8	13.7	12.1	14.8	12.1	13.8	43.8	15.4	15.6	11.4	12.5	17	11.3	9.6	5.6	16.9	18.9
Walking	35.4	41.4	36.1	32.2	31.7	33.3	41.7	27	43.9	40.4	32	24.1	45.2	25	45.3	22.4	33.2	37.5	40.4	34.8	39	25	19.1	42.9
Bicycle	7.8	5.4	8.3	9	5.8	8.6	10	11.8	3.7	3.9	10.4	9.8	6.4		4	8.8	11.1	12.5	5.3	3.5	7.4	15.3	15.7	5.7
Motorcycle / moped	5.1	8.1	7.6	6.2	2.5	2.2		3.4	6.8	7.4	3.5	6	4.5		2.4	6.1	6.2		4.3	5.7	7.4	4.2	4.5	4
Ship / boat	0.3	0.9	0.7	0.6				0.3	0.3	0.4	0.2	0.6	0.5				0.3	4.2					1.1	
Other	0.4			0.6	0.8			0.3	0.6	0.7	0.2	0.6	0.3		0.8		0.3		2.1			1.4		0.6

* As there are no statistically significant differences between respondents with regard to employment, these data are not part of the Table 3

Source: author contribution

Buses are more often used by domestic tourists (17%), and day-trippers (20%), people with lower educational levels, and with lower incomes.

Table 4

The primary mode of transport used to travel to a destination (%)*

	Total	Age						Origin		Type of visit		Education				Household monthly income					
		16-24	25-34	35-44	45-54	55-64	65+	foreign	resident	day trip	overnight	secondary or less	college	university or higher	prefer not to say	up to 500 €	501 - 1 000 €	1 000 - 2 000 €	2 000 - 3 000 €	3 000 € and more	prefer not to say
N	707	111	144	177	120	93	60	356	351	282	425	247	147	289	24	94	141	136	72	89	175
sig		0,98						0		0		0,09				0,87					
Train	1	0.9	2.1	0.6	0.8	1.1		1.7	0.3		1.6	1.2	0.7	1		1.1		2.9		2.2	
Airplane	1.8	1.8	4.9	1.1	0.8		1.7	3.1	0.6	0.7	2.6	1.2	2	2.4		1.1		0.7	2.8	6.7	1.7
Bus	11.6	11.7	13.9	4.5	12.5	17.2	16.7	6.2	17.1	20.2	5.9	19	6.1	8	12.5	24.5	10.6	5.1	8.3	9	13.1
Car	72.1	64.9	63.9	79.7	74.2	75.3	75	75.8	68.4	62.4	78.6	69.2	72.1	74.7	70.8	62.8	76.6	74.3	72.2	65.2	75.4
Rented car	1.6	0.9	0.7	2.8	2.5	1.1		2.8	0.3	0.7	2.1	0.8	1.4	2.4		1.1	1.4	2.2	5.6		0.6
Motorcycle	5.2	9.9	9.7	5.1	1.7	1.1		1.1	9.4	11.3	1.2	4.5	6.8	4.5	12.5	5.3	8.5	7.4	1.4	3.4	3.4
Caravan/ Van	5	4.5	4.9	4	6.7	3.2	6.7	9	0.9	1.4	7.3	2	10.2	5.2		1.1	2.1	4.4	9.7	12.4	4
Boat/Ship	1.4	3.6		2.3	0.8	1.1		0.3	2.6	3.2	0.2	1.2	0.7	1.7	4.2	1.1	0.7	2.9		1.1	1.7
Other	0.3	1.8							0.6		0.5	0.8				2.1					

As there are no statistically significant differences between respondents with regard to employment, and destination subregion, these data are not part of the Table 4

Source: author contribution

Unlike daily mobility and the modality selected to travel to a destination, the most popular method of transport tourists plan to use in a destination is *walking* (62% of respondents), followed by the *other / means of transport the respondents used to reach the destination* (passenger car, bus, caravan, motorcycle…) (39%), *bicycle* (9%), and *local public transport* (5%), as in Table 5.

Table 5

Method of transport used/planned to be used during respondents' stay in a destination

	Total	Age						Origin		Type of visit		Destination subregion			Education			Household monthly income				
		16-24	25-34	35-44	45-54	55-64	65+	foreign	resident	day trip	overnight	coastline	islands	mountains	secondary or less	college	university or higher	up to 500 €	501 – 1 000 €	1 000 – 2 000 €	2 000 – 3 000 €	3 000 € and more
N	707	111	144	177	120	93	60	356	351	282	425	315	376	16	247	147	289	94	141	136	72	89
Bicycle	9.3	7.2	9	9	8.3	9.7	16.7	15.2	3.4	4.3	12.7	11.4	7.7	6.3	3.2	14.3	12.5	1.1	5.7	8.1	18.1	19.1
Local PT	5.2	7.2	11.1	4	1.7	1.1	3.3	6.2	4.3	3.9	6.1	10.5	0.8	6.3	7.3	3.4	4.8	14.9	2.1	3.7	6.9	5.6
Taxi	1.4	1.8	1.4	1.7	0.8		3.3	1.7	1.1	0.7	1.9	2.5	0.3	6.3	0.4	2	2.1	1.1		0.7	1.4	5.6
Walking	61.5	61.3	55.6	55.9	69.2	65.6	71.7	55.3	67.8	62.8	60.7	49.8	71.8	50	64.4	53.7	63.3	56.4	58.9	60.3	58.3	60.7
Other	38.5	37.8	32.6	44.1	39.2	44.1	26.7	43.8	33	36.9	39.5	47.9	30.1	50	33.2	42.9	39.4	44.7	44	33.1	34.7	43.8

Source: author contribution

Visitors to island destinations tend to walk more than visitors to other destinations (72%), whereas walking is not so popular in coastal destinations (50%). Bicycles are used more than average by foreign visitors (15%), tourists (13%), and tourists with income over EUR 2,000 (18%). Local public transport is used more often by visitors aged 25 - 34 (11%) and by visitors to the coast, while this option is largely not available on the islands (1%).

Relating to the choice of transportation mean in the destination, *convenience* is the most important reason. Fully 63% of respondents reported walking as being of primary convenience. Passenger cars, motorcycles, caravans, etc. are considered to be more convenient (64%) and faster (49%) relative to other means of transport. Bicycles are used because they are convenient (58%) and environmentally friendly (47%), and local public transport because of its convenience (49%), the available facilities / services (41%), or because there is no other alternative (24%).

Table 6

The reasons for using the selected mode in a destination (%) – *2 answers*

	bicycle	PT	taxi	walking	other
N	66	37	10	435	272
convenience	57.6	48.6	60	62.8	64.3
speed	13.6	13.5	40	5.1	48.9
available facilities	19.7	40.5	0	28.7	12.5
price	12.1	21.6	10	11.7	2.2
no alternatives	3	24.3	0	11.3	13.6
safety	4.5	2.7	30	0.9	4.4
environmental reasons	47	0	0	12.9	1.1
other	1.5	0	0	2.3	1.1

Source: author contribution

The analysis showed that surveyed visitors are satisfied with the various aspects of travelling in Croatia (Table 7). They are most satisfied with maritime transport (mean = 4.4 on a scale from 1 - '*Very dissatisfied*' to 5 - '*Very satisfied*'), followed by *air* (4.2), *road* (4.1), and *railway traffic* (3.6). Regarding travel attributes, the respondents are the most satisfied with *travel safety* (4.2). Older respondents (especially over 65) are generally more satisfied with various aspects of traveling in Croatia (sig. 95% and 99%, respectively), except for the quality of rail transport.

Table 7

The level of satisfaction with different aspects of travel in Croatia

	Total	Gender		Age					
		M	F	25-34	35-44	45-54	55-64	65+	no answer
N	705	381	324	144	175	120	93	60	2
Travel safety	4.2	4.2	4.3	4.1	4.1	4.3	4.4	4.6	4
Amenities for passengers	4	4	4.1	3.9	4	4	4.2	4.4	4
Value for money	3.9	3.9	4	3.7	3.8	4	4.1	4.2	4
Actual vs. planned travel duration	4.1	4.1	4.1	4	4	4.1	4.2	4.3	3.5
Road traffic quality	4.1	4.1	4.2	4	4.1	4.1	4.3	4.5	3.5
Air traffic quality	4.2	4.2	4.3	4.2	4.1	4.2	4.2	4.8	5
Rail traffic quality	3.6	3.5	3.7	3.4	3.6	3.5	3.3	4.2	5
Water traffic quality	4.4	4.3	4.4	4.2	4.2	4.4	4.5	4.9	4

Source: author contribution

In addition to age and gender, the socioeconomic determinants of the profile, are also taken into account when determining the level of satisfaction with various aspects of travel in each visitor group (Table 8). A statistically significant greater satisfaction compared to the overall average in the context of the respondents' level of education, was found among the respondents with *university or higher* level of education, especially in the items of traffic safety, value for money, road quality, the quality of rail and maritime transport (sig. 99%). Respondents with *secondary education (or lower)* are more dissatisfied with various aspects of transport than the average. In the context of employment, the most pronounced differences were found in the group of *retirees*, with statistically significant higher levels of satisfaction for most aspects of transport (except air and rail transport quality). With regard to the level of monthly income a statistically significant difference is observed in the *group with income above EUR 3,000*, whose attitudes indicate higher satisfaction with transport safety, passenger amenities and value for money, as well as with the road and water transportation quality (sig. 99%).

Table 8

The level of satisfaction with different aspects of travel in Croatia in relation to the socioeconomic determinants of visitors to the destination

	Total	Education			Employment						Household monthly income in EUR					
		secondary or less	college	university or higher	full-time	part-time	student	unemployed	retired	domestic	up to 500	501 - 1,000	1,001 - 2,000	2,001 - 3,000	3,001 or more	prefer not say
N	705	247	145	289	481	45	69	29	72	9	94	141	135	72	89	174
Travel safety	4.2	4.1	4.2	4.4	4.2	4.1	4.4	4.1	4.6	3.8	4.2	4	4.2	4.2	4.6	4.4
Amenities for passengers	4	3.9	4.1	4.2	4	4	4.2	4	4.4	3.3	4	3.9	3.9	4	4.3	4.2
Value for money	3.9	3.7	4	4.1	3.9	4.1	4.2	3.5	4.3	3.2	3.8	3.6	3.8	4	4.4	4.1
Actual vs. planned travel duration	4.1	4	4.1	4.2	4	4	4.2	4	4.4	3.3	3.9	3.9	3.9	4.1	4.3	4.3
Road traffic quality	4.1	4	4.1	4.3	4.1	4	4.3	4	4.5	3.9	4.1	4	4.1	4.1	4.5	4.2
Air traffic quality	4.2	4.1	4.3	4.3	4.2	4.3	4.5	3.9	4.6	3.3	4.3	4.2	4.2	4.3	4.4	4.2
Rail traffic quality	3.6	3.1	3.8	3.9	3.5	3.7	4.1	3.2	4	2	3.3	3.6	3.6	3.4	3.9	3.6
Water traffic quality	4.4	4.2	4.4	4.5	4.3	4.2	4.7	4.1	4.7	4	4.4	4.3	4.3	4.3	4.7	4.4

Source: author contribution

The analysis of differences in the level of satisfaction with different aspects of travel in Croatia among groups of visitors according to the basic characteristics of their tourist visit is shown in Table 9. Interestingly, the transportation experience according to the origin of visitors shows that *foreign tourists* tend to be more satisfied than domestic tourists, with a statistically significant difference found in the perception of travel safety, passenger amenities, value for money, and quality of rail and air transportation (sig. 99%), and road transportation (sig. 95%). *Domestic tourists'* higher than average dissatisfaction is confirmed for the same aspects.

The analysis by type of visit showed that *day-trippers* are less satisfied with the factors that determine travel in Croatia, while *overnight visitors* are more satisfied than average. The differences were statistically confirmed for the same items in both groups: travel safety, amenities, quality of rail transport and quality of water transport. A statistically significant difference according to the subregion visited was found in the higher satisfaction of respondents in the *coastal region* with the quality of maritime transport (sig. 95%), and among *island visitors* with the value for money and the quality of road transport (sig. 95%). *Visitors to the mountain region* are less satisfied with passenger facilities and the quality of rail transport (sig. 95%).

Table 9

The level of satisfaction with different aspects of travel in Croatia according to the basic characteristics of the tourist visit

	Total	Origin		Type of visit		Destination sub region		
		foreign	resident	day trip	overnight	coastline	islands	mountains
N	705	355	350	281	424	314	375	16
Travel safety	4.2	4.3	4.2	4.2	4.3	4.2	4.3	4.2
Amenities for passengers	4	4.2	3.9	3.9	4.1	4	4.1	3.5
Value for money	3.9	4.1	3.7	3.9	4	3.8	4	3.6
Actual vs. planned travel duration	4.1	4.1	4	4.1	4.1	4	4.1	4
Road traffic quality	4.1	4.2	4.1	4.1	4.2	4.1	4.2	4.1
Air traffic quality	4.2	4.3	4.2	4.2	4.3	4.3	4.2	3.8
Rail traffic quality	3.6	4	3.3	3.3	3.8	3.8	3.5	2.6
Water traffic quality	4.4	4.5	4.2	4.2	4.5	4.5	4.3	3.5

Source: author contribution

Our results show differences in the way visitors travel to destination and move around the destination, which in turn highlights their needs and requirements, related to their socioeconomic parameters, characteristics of the tourist visit, or their level of satisfaction. Knowing the visitors' expectations, as well as identifying the frequency of certain behaviours, provides destination stakeholders with an insight, enabling more successful communication, and providing the right experiences.

The following section analyses the frequency of certain behaviours in smart technology usage, from the perspective of transport behaviour.

4.2.   The frequency and forms of smart technology use in tourism

This section discusses the forms of smart technology use and the relationship between the frequency of certain forms of smart behaviour and the determinants of respondents' travel behaviour with the aim of testing the hypotheses put forward.

4.2.1.   The frequency and forms of using smart technologies during vacation with regard to the primary mode of transport used to travel to the destination

Generally, the frequency of smart technologies usage is low. They are most often used *never* and *sometimes*. The most frequent type of behaviour linked to smart technology use refers to *using smart technologies to improve personal / individual experience* (mean = 2.4), *upload trip photographs* (2.2), and *update social media status* (1.9), as can be seen in Table 10.

A statistically significant difference relative to the population in all items of smart technology use is evident in respondents who travelled by air, who tend

to upload trip photographs, update their social media status, share information on their preferences with suppliers in the destination, write trip reviews, and engage in other forms of behaviour linked to smart technology (sig. 99%) more often. The respondents who travelled by camper van tend to write trip reviews and update blog content (sig. 99%), and share information on their preferences (sig. 95%) more often than the respondents in general but less often than those respondents who arrived at the destination by air.

Table 10

The frequency of smart technology usage during vacation in relation to the primary mode of transport used to travel to a destination (1= never, 5= always) - cross-tabulation analysis

		The primary mode of transport used to travel to a destination								
	Total	Train	Airplane	Bus	Car	Rented car	Motorcycle	Caravan/ Van/ Truck	Boat/ Ship/ Ferry	Other
N	*707*	*7*	*13*	*82*	*510*	*11*	*37*	*35*	*10*	*2*
Uploading trip photos (e.g. to FB, Instagram, Flickr)	*2.2*	2	3.4	2.4	2.1	3.1	2.4	2.3	2.2	2
Updating social media status with travel details (e.g. on FB, Twitter, Foursquare)	*1.9*	2.3	3.1	2.2	1.8	3	2.2	2.1	2	2
Updating blog content with travel details	*1.4*	1.1	2.1	1.3	1.3	1.2	1.5	1.9	1.8	1
Writing online travel reviews (e.g. on TripAdvisor)	*1.5*	1.6	2.5	1.5	1.5	1.9	1.7	2.2	1.6	1
Uploading video contents (e.g. to YouTube)	*1.5*	1.4	2	1.6	1.4	1.7	1.8	1.8	2	2
Using smart technologies for personal/individual experience	*2.4*	3.4	3.3	2.5	2.3	3.2	2.7	2.7	3	2
Sharing own preference-related data with destination stakeholders (destination management body, other service providers)	*1.7*	1.7	2.8	1.9	1.6	2.1	1.9	2.1	2	1.5

Source: author contribution

Furthermore, more frequent uploading of trip photographs (sig. 95%) and updating of social media status are evident in visitors who travelled to the destination by rented car (sig. 99%). However, the respondents who primarily travelled by car displayed a lesser tendency to use smart technologies (sig. 99%) for all items, including updating blog content (sig. 95%).

4.2.2. The frequency and forms of using smart technologies during vacation with regard to satisfaction with different travel aspects

The frequency of smart technology usage was analysed from the perspective of satisfaction with travel aspects - travel safety, amenities for passengers, value for money, and trip duration. (Tables 11a and 11b).

Table 11a

The frequency of smart technology usage during vacation in relation to the level of satisfaction with different aspects of the journey (1= never, 5= always) - cross-tabulation analysis

	Total	Travel safety						Amenities for passengers					
		Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl./did not use	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl./did not use
N	707	20	16	75	242	335	19	25	19	90	236	229	108
Uploading trip photos (e.g. to FB, Instagram, Flickr)	2.2	3.4	2.6	2.4	2	2.2	2.4	3.5	2.3	2	2	2.3	2.2
Updating social media status with travel details (e.g. on FB, Twitter, Foursquare)	1.9	3.4	2	2.1	1.8	1.9	1.8	3.2	1.9	1.9	1.7	2	1.9
Updating blog content with travel details	1.4	1.6	1.6	1.3	1.3	1.4	1.3	1.6	1.6	1.3	1.3	1.5	1.3
Writing online travel reviews (e.g. on TripAdvisor)	1.5	1.7	1.4	1.6	1.5	1.6	1.4	1.8	1.4	1.4	1.5	1.7	1.5
Uploading video contents (e.g. to YouTube)	1.5	1.6	1.7	1.5	1.4	1.6	1.5	1.6	1.7	1.4	1.4	1.6	1.6
Using smart technologies for personal/individual experience	2.4	3.3	2.9	2.6	2.3	2.5	2.1	3.7	2.3	2.4	2.3	2.4	2.6
Sharing own preference-related data with destination stakeholders	1.7	2.3	1.6	1.7	1.6	1.8	1.5	2.5	1.8	1.6	1.6	1.8	1.7

Source: author contribution

The respondents who are *very dissatisfied* with travel safety (Table 11a), tend to more often upload trip photographs, update their social media status, and use smart technologies to improve their travel experience (sig. 99%), as well as to share information about their preferences with service providers (sig. 95%). Unlike this group, the respondents *satisfied* with travel safety tend to upload trip photographs (sig. 99%), update social media status, and upload video content (sig. 95%) less often. The group who is *very dissatisfied* with amenities for passengers tends to upload trip photographs, update social media status, use smart technologies to improve their travel experience and share information about their preferences (sig. 99%) more often, while *satisfied* respondents upload trip photographs and update their social media status less frequently, as well as update blogs (sig. 99%) and share information about their preferences (sig. 95%).

As far as value for money of transport services is concerned (Table 11b), the group of *very dissatisfied* respondents tends to upload photographs, update social media status and share information about their preferences (sig. 99%) more often, while the *very satisfied* respondents update blogs, upload video content, and share information about preferences less often than the other respondents (sig. 95%).

Table 11b

The frequency of smart technology usage during vacation in relation to the level of satisfaction with different aspects of the journey (1= never, 5= always) - cross-tabulation analysis

	Total	Value for money						Actual vs. planned travel duration					
		Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl. /did not use	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl. /did not use
N	707	26	50	127	203	257	44	26	37	110	205	313	16
Uploading trip photos (e.g. to FB, Instagram, Flickr)	2.2	2.9	2.4	2.2	2	2.3	1.8	3.3	2.4	2	2.2	2.1	2.6
Updating social media status with travel details (e.g. on FB, Twitter, Foursquare)	1.9	2.6	2.1	2	1.8	2	1.5	3.1	2.1	1.8	1.9	1.9	1.8
Updating blog content with travel details	1.4	1.5	1.2	1.3	1.4	1.5	1.2	1.5	1.4	1.2	1.4	1.4	1.2
Writing online travel reviews (e.g. on TripAdvisor)	1.5	1.8	1.4	1.4	1.5	1.6	1.5	1.7	1.4	1.4	1.5	1.6	1.6
Uploading video contents (e.g. to YouTube)	1.5	1.6	1.5	1.5	1.5	1.6	1.3	1.5	1.6	1.4	1.5	1.6	1.5
Using smart technologies for personal/individual experience	2.4	2.8	2.7	2.5	2.3	2.5	2.4	3.2	2.7	2.3	2.4	2.5	2.6
Sharing own preference-related data with destination stakeholders	1.7	2.4	1.6	1.6	1.7	1.9	1.4	2.2	1.7	1.5	1.7	1.8	1.4

Source: author contribution

458

More often than others, respondents who are *very dissatisfied* with travel duration tend to upload photographs and update their social media status (sig. 99%) as well as use smart technologies to improve their travel experience and share their preference-related data (sig. 95%).

Summing up, there are statistically significant differences in the frequency of smart technologies usage during vacation with regard to satisfaction with various aspects of transport. In groups of *very dissatisfied* respondents with all four aspects of travel, there is statistically significant greater frequency of individual forms of smart behaviour during vacation.

4.2.3.   Smart technology usage during vacation with regard to the perceived quality of transport services, by transport sector

Different frequency of smart technology usage in tourism was analysed with regard to differences in the respondents' perceptions of the quality of transport sectors used in tourist travels (tables 12a and 12b). As shown, the group of respondents who are *very dissatisfied* with road traffic quality tends to more often update their social media status and share information about their preferences (sig. 99%), as well as write trip reviews and use smart technology to improve their personal travel experience (sig. 95%). Compared with the other groups, the group of *satisfied* respondents less often takes part in all of the suggested forms of smart behaviour (sig. 99%), with the exception of updating blogs.

With regard to satisfaction with air traffic, there are significant differences at the level of the group of respondents who *did not use air transport services* but who use practically all forms of smart technology to a lesser extent (sig. 99%). Only the group of respondents *very dissatisfied* with air traffic quality tends to more frequently update social media status, while *dissatisfied* respondents tend to more often upload photographs, write reviews, use smart technology to improve their experience, and share preference information (sig. 99%) as well as update blogs (sig. 95%).

Very satisfied respondents display similar behaviour, although differences, compared with the average pattern, are more significant with regard to updating blog content, writing reviews, uploading video content and sharing information on preferences (sig. 99%).

Table 12a

The frequency of smart technology usage during vacation in relation to the perceived quality of transportation services, by transport sector (1= never, 5= always) - cross-tabulation analysis

	Total	Road traffic quality						Air traffic quality					
		Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl. /did not use	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl. /did not use
N	707	14	31	89	264	290	19	5	12	22	47	106	515
Uploading trip photos (e.g. to FB, Instagram, Flickr)	2.2	3.2	2.7	2.6	1.9	2.2	2.5	3.2	3.2	2.9	2.2	2.5	2.1
Updating social media status with travel details (e.g. on FB, Twitter, Foursquare)	1.9	3.1	2.4	2.2	1.7	1.9	2.3	3.2	2.6	2	2	2.2	1.9
Updating blog content with travel details	1.4	1.4	1.3	1.4	1.3	1.4	1.3	1.8	2	1.9	1.3	1.8	1.3
Writing online travel reviews (e.g. on TripAdvisor)	1.5	2.1	1.5	1.7	1.4	1.6	1.9	2.2	2.7	2	1.4	1.9	1.4
Uploading video contents (e.g. to YouTube)	1.5	1.7	1.5	1.6	1.4	1.6	1.9	1.8	1.7	1.9	1.5	1.8	1.4
Using smart technologies for personal/individual experience	2.4	3.2	3.2	2.6	2.3	2.4	3.2	3	3.6	2.8	2.6	2.4	2.4
Sharing own preference-related data with destination stakeholders	1.7	2.7	1.9	1.9	1.6	1.8	1.7	2	2.8	2	1.7	2	1.6

Source: author contribution

460

Table 12b

The frequency of smart technology usage during vacation in relation to the perceived quality of transportation services, by transport sector (1= never, 5= always) - cross-tabulation analysis

	Total	Rail traffic quality						Water traffic quality					
		Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl. /did not use	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not appl. /did not use
N	707	24	41	34	27	96	485	6	7	40	86	199	369
Uploading trip photos (e.g. to FB, Instagram, Flickr)	2.2	2.1	2.4	2.8	2.3	2.3	2.1	1.8	3	2.3	2.1	2.2	2.2
Updating social media status with travel details (e.g. on FB, Twitter, Foursquare)	1.9	1.8	1.9	2.2	2.2	2.1	1.9	1.7	2.3	1.9	1.8	1.9	2
Updating blog content with travel details	1.4	1.6	1.4	1.5	1.4	1.8	1.3	1.7	1.9	1.4	1.4	1.6	1.2
Writing online travel reviews (e.g. on TripAdvisor)	1.5	1.7	1.6	1.9	1.7	1.9	1.4	1.7	2.3	1.5	1.7	1.7	1.4
Uploading video contents (e.g. to YouTube)	1.5	1.5	1.4	1.6	1.6	1.9	1.5	1.7	1.7	1.5	1.5	1.6	1.5
Using smart technologies for personal/individual experience	2.4	2.2	2.6	2.9	2.4	2.5	2.4	1.7	3.3	2.4	2.5	2.4	2.5
Sharing own preference-related data with destination stakcholders	1.7	1.8	1.8	1.7	2.1	2	1.6	1.7	2.9	1.6	1.8	1.8	1.7

Source: author contribution

Similar to satisfaction with air traffic quality, there are obvious and significant differences in the group of respondents who *did not use* railway transport services but who, more frequently than the average respondent display all forms of smart technology use, with the exception of updating social network status and using smart technology to improve their travel experience (Table 12b). Respondents who are *very satisfied* with rail traffic tend to more frequently update their blogs, write reviews, upload video content and share information regarding their personal preferences (sig. 99%).

The least statistically significant differences with regard to the frequency of smart technology usage were found in the context of water traffic quality perception. More frequently, *dissatisfied* respondents tend to share their information on personal preferences (sig. 99%) and write trip reviews (sig. 95%), whereas *very satisfied* respondents update their blogs (sig. 99%), and write reviews and upload video content (sig. 95%). Respondents who *did not use water traffic services* are less inclined to update their blogs and write trip reviews (sig. 99%).

The auxiliary hypotheses were disproved by the presented findings. In other words, it was confirmed that the frequency of smart technology use differs between groups of destination visitors depending on the primary mode of transportation they use to travel to the destination (H1). Respondents who travelled by air tended to use smart technologies more often, especially to upload travel photos, update their social media status, and share information about their personal preferences with service providers at their destination. The study also confirmed that there are statistically significant differences in the frequency of smart technology use during vacation in relation to satisfaction with various aspects of travel (H2). The group of respondents who are very dissatisfied with all aspects of travel (safety, amenities for passengers, value for money, and travel duration) tend to use smart technologies more frequently during their trip, especially to upload travel photos, update their status on social media, and share information about their personal preferences. The results also indicate that there are statistically significant differences in the frequency of smart technology use during the vacation in relation to the perceived quality of individual transportation sectors (H3). The behaviour of different groups of respondents according to the level of satisfaction with air and road transport is statistically different from the average behaviour, with most groups displaying a higher frequency of use of various forms of smart behaviour and attitudes.

Based on the testing and refutation of the auxiliary hypotheses, the null hypothesis is also refuted while there are differences established in the use of smart technologies during vacation between groups of destination visitors of different transportation behaviour and different levels of satisfaction with transportation services (H0). Statistically significant differences are confirmed for individual groups of respondents in terms of satisfaction with various aspects of travel, the perceived quality of individual transport sectors, and/or the primary mode of transportation used when travelling to the destination.

5.   CONCLUSIONS AND DISCUSSION

Compared to the existing previous research, the main findings on the general determinants of travel behaviour of the surveyed population of destination visitors indicate the following:

- In the modal split of travel to the destination, 72.2% are by car, 11.6% by bus, 5.2% by motorcycle, and 5% by caravan/camper van, which is somewhat different from the findings about daily mobility (daily mode choice is less car-centred). According to the data of Institute for Tourism (2020) these proportions are slightly higher than at the national level in 2019.

- Respondents' preferred modes of transportation at the destination indicate more sustainable behaviour at the destination than at home, as walking is the most popular mode of transportation used (61.5%), followed by bicycling (9.3%) as the second, and local public transportation (5.2%) as the third most popular mode of transportation. The nationally recorded pattern (Institute for Tourism, 2020) differs somewhat (own car, 70%; local (public) transport, 27%; taxi, 22%; bicycle, 9%; and walking, 10%), due in part to the COVID-19 pandemic in 2021, when this primary research was conducted, and in part to the difference in scope of the study. Hibbert, et al. (2013) pointed that the difference in sustainability of tourist behaviour at home and at destination is determined by identities, which sometimes play a greater role than cost and environmental issues. The use of different modes of transportation to move around the destination is a vital indicator of the sustainability of tourism in the destination according to *ETIS* by European Commission (n.d.). Established in previous studies (Mrnjavac & Slavić, 2018), the relationship between everyday mobility patterns and travel patterns was reconfirmed by this research.

- Local transportation accounts for 4% of tourist spending in the destination. This primary research found that tourist spending in total - averaging EUR 1,744 (with the length of stay of 9 days) is slightly higher than the amount provided by the Institute for tourism (2020).

- The accessibility of the destination ranks third among the factors that make it attractive to tourists. However, the low satisfaction with transport at the local level reported by Institute for Tourism (2020) indicates potential problems.

- The analysis of the perception of the Croatian transportation system shows that visitors are the most satisfied with the quality of water traffic (4.4) and the least satisfied with the quality of rail transport (3.6). With regard to aspects of travel, respondents are the most satisfied with transportation safety (4.2). The satisfaction is higher among men than women, among older respondents than younger ones, and among foreign tourists than domestic ones. Regarding the overall Croatian transport system, the dominance of road transport in everyday mobility and tourism-related travel is previously recorded (Mrnjavac & Slavić, 2018; Slavić, et al.,

2020), and significant improvements in air, water, and rail tourism-related transportation at the national level were suggested (Slavić & Mrnjavac, 2019).

- In general, smart technologies are rarely used, mostly never or sometimes at the total sample level. Women under 34, tourists in coastal areas, and students are groups within the population that use smart technologies most often. Male tourists, tourists over 45 years old, island visitors, and retirees, on the other hand, use smart technologies less frequently.

Among surveyed destination visitors whose transportation behaviour is as described above, smart technology use is most commonly related to enhancing personal travel experiences, uploading travel photos, and updating social media status with travel data. Statistically significant (and largest) differences in the use of smart technologies to generate online contents and improve personal experiences, according to the three defined parameters of respondents' transportation behaviour, relative to the total sample and from the perspective of highest frequency, are observed as follows - presented in Table 13. The findings suggest that the frequency of smart technology use is much higher among the highlighted surveyed groups of destination visitors than the average for the overall sample.

Table 13

The frequency of smart-tourism aspects of respondents' behaviour during vacation in relation to transportation behaviour sets of parameters

N	Total 707	The highest frequency of smart tourism aspects of the respondents' behaviour during vacation in relation to...		
		...the primary mode of transport used to travel to a destination	...the level of satisfaction with different aspects of the journey	...the perceived quality of transportation services by transport sector
Uploading trip photos (e.g. to FB, Instagram, Flickr)	2.2	group of respondents who travelled to the destination by air (**3.4**, sig. 99%)	group of respondents who are very dissatisfied with the amenities (**3.5**, sig. 99%)	groups of respondents who are very dissatisfied with road traffic and air traffic quality (**3.2**, sig. 99%)
Updating social media status with travel details (e.g. on FB, Twitter, Foursquare)	1.9	group of respondents who travelled to the destination by air (**3.1**, sig. 99%)	group of respondents who are very dissatisfied with travel safety (**3.4**, sig. 99%)	group of respondents who are very dissatisfied with road traffic quality (**3.1**, sig. 99%)
Updating blog content with travel details	1.4	group of respondents who travelled to the destination by air (**2.1**, sig. 99%)	group of respondents who are very satisfied with the amenities (1.5, sig. 99%)	group of respondents who are neither dissatisfied nor satisfied with air traffic quality (**1.9**, sig. 99%)
Writing online travel reviews (e.g. on TripAdvisor)	1.5	group of respondents who travelled to the destination by air (**2.5**, sig. 99%)	group of respondents who are very satisfied with the amenities (1.7, sig. 95%)	group of respondents who are dissatisfied with air traffic quality (**2.7**, sig. 99%)
Uploading video contents (e.g. to YouTube)	1.5	group of respondents who travelled to the destination by air (**2.0**, sig. 95%)	group of respondents who are very satisfied with travel safety (1.6, sig. 95%)	group of respondents who are very satisfied with rail traffic quality (**1.9**, sig. 99%)
Using smart technologies for personal/individual experience	2.4	group of respondents who travelled to the destination by air (**3.3**, sig. 95%)	group of respondents who are very dissatisfied the amenities (**3.7**, sig. 99%)	group of respondents who are dissatisfied with air traffic quality (**3.6**, sig. 99%)
Sharing own preference-related data with destination stakeholders	1.7	group of respondents who travelled to the destination by air (**2.8**, sig. 99%)	group of respondents who are very dissatisfied with the amenities (**2.5**, sig. 99%)	group of respondents who are dissatisfied with water traffic quality (**2.9**, sig. 99%)

Source: author contribution

465

Further research should be broader in scope, i.e., include a larger sample in different regional destinations, in order to demonstrate, test, and validate (or not) the differences in transportation behaviour between groups of respondents in general and the differences in smart technology use identified in this paper. Also, establishing the frequency of use of specific types of STTs among destination visitors would be a valuable attribute of further research, while it could support destination authorities and tourism businesses in using or providing the right tools, approaches, online applications, information sources, and/or smart systems in order to improve the quality of destination experiences and achieve good business results. Future research could also provide a cross-section of the opinions, and attitudes of the four groups of destination tourism stakeholders - tourism authorities, local businesses, visitors, and local people, on the same issues of destination planning and development in terms of smartness and sustainability. The "supplemented" *ETIS* approach used in this research allows for such an analysis. One of the authors' future efforts would be to collect data on the impacts of DDDMS on destination tourism from the perspective of the identified groups of stakeholders.

Previous research has shown that the key factors of STTs affecting tourists' experience, satisfaction, and destination loyalty are accessibility and informativeness (as identified by Azis, et al., 2020), as well the interactivity, and personalization (Jeong & Shin, 2019). Tourism authorities should therefore: 1. monitor the technology-related behaviour of their visitors; 2. improve STT infrastructures by providing, at a minimum, high-speed internet accessibility; 3. provide travellers with timely, relevant, credible, and helpful information; and 4. learn from established STT usage patterns in order to personalize the offer.

Knowing the visitor travel and mobility patterns should help local (and regional) authorities strategically plan the economic development of destinations (by better managing people and supply flows to minimize negative impacts on visitors and local population), manage transportation systems, and adapt to the demands of the tourism market. Data on levels of satisfaction with transportation services allow for practical improvements that should be reflected in visitor perceptions. Many improvements to the transportation system in destinations and increased adoption of ICT not only benefit visitors, but also improve the quality of life for local populations.

A cross-cutting view of travel behaviour and user-generated activities enabled by STTs while travelling provides policy and tourism authorities with a number of arguments and justifications for investing in enhancing the destination "smartness". The most obvious arguments arise from the relationship between STT-related behaviour and online content creation about experiences in a visited destination and the frequency of such actions among visitor groups relative to the primary mode of travel. For example, if a destination attracts mainly visitors travelling by car (and most Croatian destinations do), it is valuable information that this visitor group is less likely to use STTs to share their experiences, and tourism bodies should explore the reasons for this (whether a lack of offer from the destination, or an intrinsic factor) and opt to improve the use of STTs among this group to benefit from their behaviours.

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PONAŠANJE U TRANSPORTU, PERCIPIRANO ISKUSTVO I UPORABA PAMETNE TEHNOLOGIJE POSLJETITELJA TURISTIČKIH DESTINACIJA[2]

Sažetak

U svrhu utvrđivanja razlika u ponašanju posjetitelja turističkih destinacija, cilj je ovoga rada identificirati njihove navike, stavove i aktivnosti u vezi s transportnim mogućnostima kojima se svakodnevno koriste tijekom putovanja do destinacije te prilikom boravka u mjestu destinacije, uz naglasak na uporabi pametne tehnologije. Rezultati ovoga istraživanja dio su opsežnijeg istraživanja o ponašanju posjetitelja turističke destinacije, koje je provedeno u sklopu projekta Cekom – Competence Center for Smart Cities, gdje su se istraživački instrumenti i metode temeljili na ETIS metodologiji. Istraživanje je obuhvatilo približno 700 posjetitelja Primorsko-goranske županije, koja je uzeta kao studija slučaja. Rezultati istraživanja pokazali su da je pristupačnost jedan od ključnih čimbenika u odabiru destinacije sudionika istraživanja te da se njihovo svakodnevno ponašanje u transportu razlikuje od ponašanja kad putuju ili su na odmoru. Utvrđene su statistički značajne razlike u percipiranom iskustvu različitih grupa posjetitelja destinacije, kao i učestalost uporabe pametnih tehnologija među grupama posjetitelja različitog ponašanja u transportu. Jedno od ograničenja istraživanja u smislu generalizacije zaključaka jest to što je istraživanje bilo

usmjereno na specifičnu destinaciju, kao i unaprijed određena struktura uzorka, što je u skladu s uvjetima koje projekt koji financira EU treba ispuniti. Razlike u ponašanju u transportu između grupa ili sudionika općenito te u odnosu na uporabu pametnih tehnologija trebalo bi potvrditi na većem uzorku, u drugim destinacijama. Uvažavanje aspekata ponašanja, tj. razlika u ponašanju u transportu i uporabi pametnih tehnologija ima društvene i praktične implikacije na destinacije, u kontekstu promijenjene dinamike u odnosima i ulogama dionika na turističkom tržištu.

Ključne riječi: *ponašanje u transportu, posjetitelji destinacije, zadovoljstvo putovanjem, kvaliteta transportnih usluga, uporaba pametne tehnologije.*

JEL klasifikacija: L83, M31, R40.