

EXPLORING THE RELATIONSHIP BETWEEN SERVICE PREFERENCES AND DIGITAL INFORMATION SOURCES IN THE CONTEXT OF ACTIVE TOURISM

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Abstract: The aim of the research is to explore the relationships between the different forms of active tourism and the service needs that arise, and the role of the use of information sources in the decision-making of active tourism participants. The closed-ended questionnaire survey investigated respondents' hiking habits, the services they use and the sources of information on active tourism. The questionnaire was completed by 169 people who had hiked in the Lake Velence area, their responses were analysed using SPSS and Excel programs. Cluster analysis was used to identify different groups of active tourism participants, depending on the type of tours they prefer, the services they use and the sources of information they rely on. ANOVA (one-way analysis of variance) was used to test whether different types of active tourism influence the use of services and to identify which services are most important for each group. In addition, a Pearson correlation matrix was constructed to show the relationships between each of the quantitative variables. The research contributes to a better understanding of how different forms of active tourism and different information sources shape the service needs of active tourism participants, which can help to target the development of tourism services and the transition to the circular tourism.

Keywords: active tourism, Lake Velence, recreation, hiking, cycling, water tourism, digitalisation, circular tourism

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INTRODUCTION

Active tourism has gained in popularity in recent years, as various types of active tourism activities and the physical activity associated with them contribute to both physical and mental well-being. During the COVID-19 epidemic there was a particularly significant increase in the number of people choosing active recreation as a leisure activity, given that this form of recreation was allowed after a period of time during the curfew. The stresses of globalisation, urbanisation and technological development have led more and more people to spend their leisure time in nature, where they can experience peace and relaxation. Activities in natural environments, such as hiking, cycling or water tours offer a complex experience that combines the exploration of nature, social recreation and mental regeneration (Dávid et al., 2012).

Hiking is widely available, requires minimal equipment and is accessible to almost all age groups. It also lends itself to social experiences (Zuckerman, 1990, 2008), as hiking with friends and family helps to deepen relationships while maintaining physical health and providing opportunities for mental regeneration. Cycling offers a different experience, as it allows the exploration of more natural or even cultural sites in a given time, and because of its greater mobility and speed, it provides a more dynamic experience, offering a broader, more distant perspective of the landscape. At the same time, cycling tours require specialised equipment and the existence of adequate infrastructure is a key factor for quality cycling tourism. Water-based tourism offers a very special and unique experience, providing a different perspective on the natural environment, with the opportunity to observe aquatic wildlife at close quarters. It is completely different from hiking or cycling, as waves and weather conditions have a direct impact on the dynamics of the trip and require a different kind of physical activity. Specialised equipment is needed to carry out the tour, and it is important to choose safe routes, identify suitable mooring and resting places, and always monitor the weather and water conditions.

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Recreation in the natural environment is an effective stress-relieving tool, which is particularly important in modern societies, contributing to general well-being and health. The aim of our research is to identify the different service needs and ways of obtaining information on active tourism, which will help local tourism operators to implement targeted improvements to enhance the tourism experience. A variety of services, varied hiking trails, cycle paths, viewpoints and a wide range of leisure activities contribute to a positive visitor experience. It is also important to note that some forms of active tourism are year-round activities, thus helping to reduce the seasonality of tourism.

The habits of active tourism and preferences revealed by the research provide an opportunity for tourism operators to adapt their offer to the needs of participants of active tourism and to enhance the tourism value of the area through targeted improvements. The development of active tourism can also contribute to the development of the local economy, especially for smaller communities where tourism revenues are of particular importance.

LITERATURE REVIEW

Active tourism is based directly on the natural environment and includes a variety of nature-based activities such as hiking, cycling or water sports. These activities have a significant impact on the economic and social development of rural regions, where the natural environment is one of the main attractions (Fredman & Margaryan, 2014; Buckley, 2010). Active tourism is playing an increasingly important role, not only in economic terms, but also in promoting rural development and strengthening local culture (Cucic et al., 2024). Active tourism requires relatively low infrastructure investment while contributing to the growth of the local economy (Dávid et al., 2011) and to sustainability (Fredman & Tyrväinen, 2010), which is emphasized for different types of tours (Cervený & Bricker, 2020), as these activities have a low ecological footprint (Gross & Sand, 2019). According to Knowles & Scott (2024), community participation and benefits from tourism increase local residents' support for conservation efforts. Sustainability is a key issue, and sustainable practices should be adopted to preserve the natural environment (Vargáné & Dávid, 2024).

One of the main attractions of different types of active tourism activities is the experience of direct contact with nature (Vargáné et al., 2024), which is particularly important for people living in cities, as it provides opportunities for stress relief and mental regeneration (Tóth et al., 2010; Swarbrooke, 2003). Demand for recreation in natural environments has increased in recent years, especially in areas with significant natural assets (Dax & Tamme 2022). Active tourism participants have different motivations, including relaxation, social experiences and exploring nature (Dustin et al., 2019).

The "soft adventure" category includes hiking, which requires moderate physical activity and little equipment, making it ideal for tourists who want to explore nature but are looking for less extreme experiences (Pomfret & Bramwell, 2014; Müller et al., 2017). For example mountain landscapes are a major attraction and provide opportunities for a wide range of active tourism activities (Gozner & Zarrilli, 2012). To expand the opportunities for active tourism, it is important to develop and make available appropriate infrastructure (e.g. accommodation, roads, restaurants) that encourages visitor satisfaction and environmentally responsible behaviour (Ismail, 2021) and service providers should take into account the needs of different groups of visitors and develop services that meet the expectations of hikers (Vargáné & Dávid, 2024).

Cycling allows exploring more natural and cultural attractions in a shorter time, providing a dynamic experience for bikers. However, this requires the development of adequate infrastructure through the provision of cycle routes and service points. Water tour is a unique experience, as it offers participants a unique perspective on the natural environment and aquatic wildlife, but it also requires special equipment and greater attention.

Technological advances, in particular the proliferation of digital maps and mobile apps, have significantly improved the experience of active tourism by increasing tourists' safety and making it easier to find their way around. This has also made the forms of active tourism more attractive for less experienced participants (Hiiker, 2023; Bichler-Peters, 2020). In Hungary, hiking is a particularly popular recreational activity and the development of sustainable hiking trails and tourism infrastructure is increasingly being addressed in domestic tourism development strategies (Dávid-Baros, 2007; Kovács & Michalkó, 2011). In addition, the network of nature parks and protected areas plays an important role in boosting rural tourism and contributes to the sustainable development of the local economy (Duda Gromada et al., 2024). The drive for sustainability (Dávid et al., 2012, El Archi et al., 2023) and the growing interest in nature-based tourism is encouraging tourism developers to try new ways to make less popular destinations more attractive (Priatmoko et al., 2021).

Aim of the research, Research Questions

The aim of the research is to explore the links between different forms of active tourism and emerging service needs, and to investigate the role of the use of information sources in the decision-making process of active tourism participants. The results will contribute to the targeted development of tourism services and circular tourism.

In our study, several research questions were formulated in order to get a comprehensive picture of the habits and preferences of active tourism participants and the relationship between the services they use:

1. What clusters can be identified among active tourism participants, grouped by type of tour, services used and information sources?
2. Does type of active tourism influence the use of services and information sources?

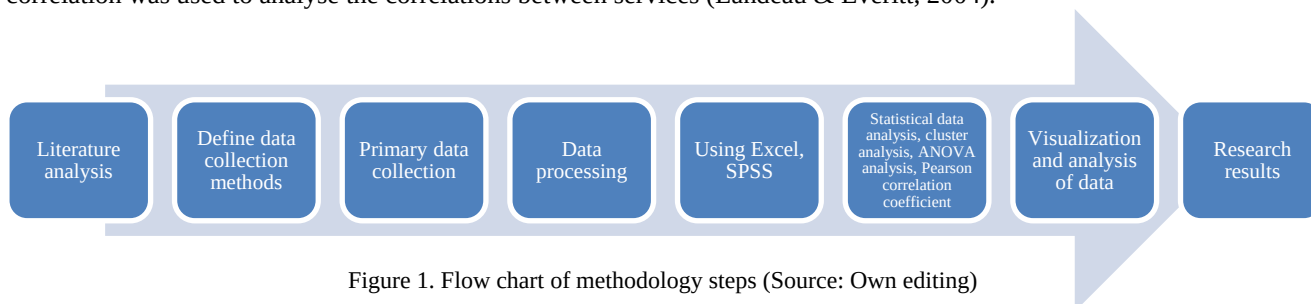
Hypotheses:

H1: At least three distinct clusters can be identified among active tourism participants, with some groups relying more on traditional information sources and others preferring more modern, digital tools.

H2: The type of active tourism significantly influences the use of services and information sources, e.g. cyclists use different services and information sources than hikers or water tourists.

METHODOLOGY

In our research, primary and secondary data were collected to understand the preferences of active tourism participants, as shown in Figure 1. The primary data collection involved an online questionnaire survey using social media platforms to reach a wide range of respondents. The questionnaire consisted of closed-ended questions to gauge respondents' demographics and habits for each form of active tourism, examining the services used and the source of information about active tourism. Secondary data collection involved an analysis of the literature, reviewing previous research and theories on active tourism. This enabled the primary data collected to be interpreted in a broader context and the literature analysis provided a theoretical framework for the research. SPSS statistical software and Excel were used to analyse the data, with statistical data analysis, cluster analysis, one-way analysis of variance (ANOVA) and Pearson correlation coefficient analysis were carried out. The K-means cluster analysis allowed the classification of active tourism participants into homogeneous groups based on the use of services and information sources without the need for previously known clusters. ANOVA was used to test whether there were significant differences between clusters in terms of service use, while Pearson correlation was used to analyse the correlations between services (Landeau & Everitt, 2004).

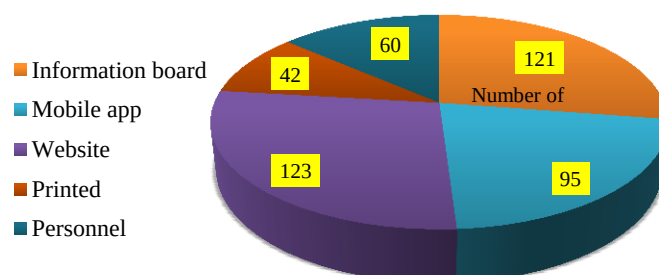
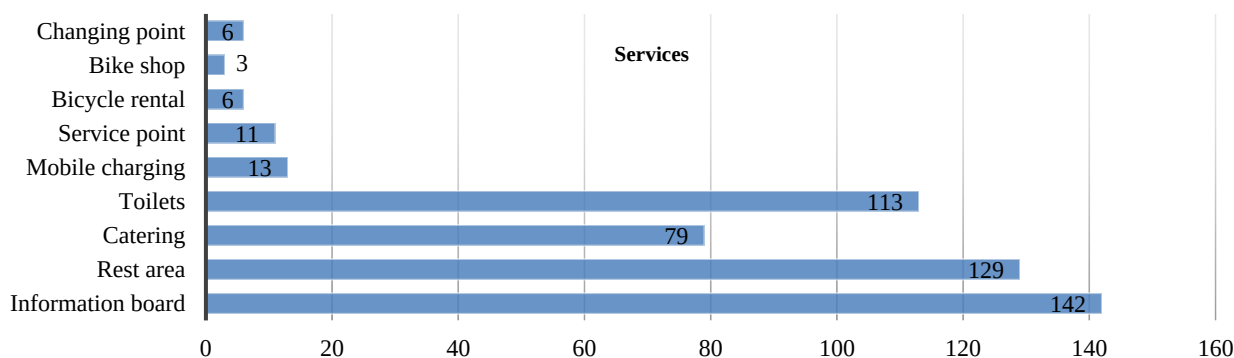


RESULTS

During the research, various analyses and statistical tests were carried out to gain a deeper understanding of the data and the relationships. First, statistical data analysis was carried out using the Excel program.

Figure 2 shows the frequency of use of the different services, which shows that the use of information boards and rest areas stands out from the other services. In the case of information boards, 142 respondents indicated that they had used this service, meaning that traditional, on-site sources of information remain important for different types of hikers. In the case of rest areas, 129 respondents indicated this option, confirming the need for physical recovery and rest during each hike. Restrooms were identified by 113 respondents as the most important basic amenity. Meals were important for around half of the respondents, but the possibility of charging mobile phones was interesting, selected by 13 respondents, suggesting that technological needs are not yet as widespread, but that demand for this type of service may increase in the future.

We also looked at how each piece of information was obtained, as shown in Figure 3. The largest proportion of respondents, 123, use websites to obtain information, indicating that online resources are extremely important for different types of hikers. Almost the same number, 121 respondents, consider information boards important, meaning that on-site information remains of great importance. 95 respondents ticked mobile apps, indicating the growing role of digital devices among active hikers. The graph shows a decreasing trend in the role of personal information sources and printed material.



Subsequently, a cluster analysis was carried out using SPSS software to explore the habits and preferences of active tourism participants based on the different types of active tourism (hiking, cycling, water tours), the services used and the sources of information. The K-Means Cluster Analysis resulted in the identification of three distinct clusters with significant differences in tourists' behaviour and needs, as shown in Table 1.

Table 1. K-Means Cluster Analysis (Source: Own editing with SPSS)

Final Cluster Centers	Cluster		
	1	2	3
Service-Information board	0.80	0.86	1.00
Service-Rest area	0.70	0.82	0.67
Service-Catering	0.44	0.49	0.50
Service-Toilets	0.61	0.73	0.50
Service-Mobile charging	0.06	0.10	0.00
Service- Service point	0.03	0.03	1.00
Service-Bicycle rental	0.04	0.00	0.50
Service-Bike shop	0.00	0.00	0.50
Service-Changing point	0.03	0.02	0.33
Information-Information board	0.68	0.74	0.83
Information-Mobile app	0.00	1.00	0.50
Information-Website	0.69	0.76	0.67
Information-Printed	0.32	0.16	0.67
Information-Personnal	0.41	0.33	0.17
Active tourism-Hiking	0.93	0.96	1.00
Active tourism-Cycling	0.21	0.21	0.50
Active tourism- Watersports	0.03	0.05	0.00

The first cluster includes 71 respondents, 93% of whom are hikers. For them, traditional services are important, with information boards (mean: 0.80), rest areas (0.70) and toilets (0.61). This group relies mainly on on-site services, while for information they prefer information boards (0.68) and printed material (0.32). They make little use of digital resources such as mobile apps (mean: 0.00). They can be considered more traditional, less technology-oriented active hikers who like to walk in nature and prefer the available on-site infrastructure.

The second cluster is the largest, consisting of 92 people, also dominated by hikers (96%), but with a 5% share of water hikers. This group also makes use of traditional services such as information boards (0.86), rest areas (0.82) and toilets (0.73), but their preference for mobile apps (1.00) to obtain information is particularly high. This cluster also makes high use of digital information sources, mobile apps and websites (0.76). This cluster includes active hikers who, although they also use traditional services, prefer to use modern technology to obtain the information they need.

The third cluster is the smallest, with only 6 people, and is made up of 50% cyclists and 50% hikers. For cyclists, certain services are of high importance, such as service points (1.00), bike rental (0.50) and bike shops (0.50). In addition, digital information sources are widely used, especially mobile apps (0.50), but printed materials are also preferred (0.67). This group therefore includes active hikers who use multiple services, especially cycling infrastructure, while relying on both digital and print resources. Following cluster analysis, ANOVA analysis was conducted to test for significant differences between clusters, as shown in Table 2.

Table 2. ANOVA analysis (Source: Own editing with SPSS)

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Service-Information board	0.142	2	0.135	166	1.052	0.352
Service-Rest area	0.276	2	0.181	166	1.528	0.220
Service-catering	0.059	2	0.253	166	0.232	0.793
Service-Toilets	0.390	2	0.221	166	1.765	0.174
Service-Mobile charging	0.053	2	0.072	166	0.738	0.480
Service- Service point	2.719	2	0.029	166	93.146	0.000
Service- Bicycle rental	0.707	2	0.026	166	26.832	0.000
Service-Bike shop	0.723	2	0.009	166	80.053	0.000
Service-Changing point	0.277	2	0.032	166	8.778	0.000
Information-Information board	0.123	2	0.206	166	0.596	0.552
Information-Mobile app	20.049	2	0.009	166	2218.736	0.000
Information-Website	0.112	2	0.200	166	0.558	0.573
Information-Printed	1.063	2	0.177	166	5.992	0.003
Information-Personnel	0.246	2	0.230	166	1.070	0.345
Active tourism-Hiking	0.027	2	0.052	166	0.513	0.600
Active tourism-Cycling	0.246	2	0.171	166	1.439	0.240
Active tourism-Water sports	0.019	2	0.040	166	0.474	0.623
The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.						

The analysis found that service points ($F = 93.146$, $p < 0.001$) and bicycle rental shops ($F = 26.832$, $p < 0.001$) showed significant differences between clusters. These services are particularly important for the third cluster. The use of mobile apps also shows large differences ($F = 2218.736$, $p < 0.001$), especially among participants in the second cluster. This indicates that the use of mobile apps is a significant differentiating factor among active hikers. Information boards and rest areas, on the other hand, did not show significant differences between clusters ($p > 0.05$), suggesting that these services are generally important for participants in different active tourism activities, regardless of the cluster to which they belong. Finally, the Pearson correlation coefficient was used to analyse the relationships between the use of each service, as shown in Table 3.

Table 3. Pearson correlation coefficient (Source: Own editing with SPSS)

		Correlations								
		Service-Information board	Service-Rest area	Service-Catering	Service-Toilets	Service-Mobile charging	Service-Service point	Service-Bicycle rental	Service-Bike shop	Service-Changing point
Service-Information board	Pearson Correlation	1	-0.053	0.052	-0.032	0.005	0.050	-0.004	0.059	0.084
	Sig. (2-tailed)		0.495	0.498	0.675	0.952	0.522	0.963	0.449	0.280
	N	169	169	169	169	169	169	169	169	169
Service-Rest area	Pearson Correlation	-0.053	1	.159*	0.140	0.109	0.034	-0.119	-0.031	-0.119
	Sig. (2-tailed)	0.495		0.039	0.069	0.160	0.660	0.124	0.693	0.124
	N	169	169	169	169	169	169	169	169	169
Service-Catering	Pearson Correlation	0.052	.159*	1	.206**	.219**	0.041	0.077	-0.036	0.077
	Sig. (2-tailed)	0.498	0.039		0.007	0.004	0.594	0.322	0.641	0.322
	N	169	169	169	169	169	169	169	169	169
Service-Toilet	Pearson Correlation	-0.032	0.140	.206**	1	0.109	0.033	-0.001	-0.096	-0.001
	Sig. (2-tailed)	0.675	0.069	0.007		0.159	0.671	0.992	0.216	0.992
	N	169	169	169	169	169	169	169	169	169
Service-Mobile charging	Pearson Correlation	0.005	0.109	.219**	0.109	1	-0.076	0.065	-0.039	0.065
	Sig. (2-tailed)	0.952	0.160	0.004	0.159		0.325	0.404	0.616	0.404
	N	169	169	169	169	169	169	169	169	169
Service-Service point	Pearson Correlation	0.050	0.034	0.041	0.033	-0.076	1	.338**	.509**	.209**
	Sig. (2-tailed)	0.522	0.660	0.594	0.671	0.325		0.000	0.000	0.006
	N	169	169	169	169	169	169	169	169	169
Service-Bicycle rental	Pearson Correlation	-0.004	-0.119	0.077	-0.001	0.065	.338**	1	.459**	0.136
	Sig. (2-tailed)	0.963	0.124	0.322	0.992	0.404	0.000		0.000	0.078
	N	169	169	169	169	169	169	169	169	169
Service-Bike shop	Pearson Correlation	0.059	-0.031	-0.036	-0.096	-0.039	.509**	.459**	1	.216**
	Sig. (2-tailed)	0.449	0.693	0.641	0.216	0.616	0.000	0.000		0.005
	N	169	169	169	169	169	169	169	169	169
Service-Changing point	Pearson Correlation	0.084	-0.119	0.077	-0.001	0.065	.209**	0.136	.216**	1
	Sig. (2-tailed)	0.280	0.124	0.322	0.992	0.404	0.006	0.078	0.005	
	N	169	169	169	169	169	169	169	169	169

*. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed)

In relation to the use of meals and other services, there is a strong correlation between meals and toilet use, with a significant positive correlation ($r = 0.206$, $p = 0.007$). This means that those who use meals are more likely to use toilets. A significant positive correlation is also found between eating out and using a mobile phone charger ($r = 0.219$, $p = 0.004$), suggesting that those who eat out during the different forms of tours are more likely to use a mobile phone charger.

Several associations with the use of cycling services can be found. A strong positive correlation is found between service points and bicycle rentals ($r = 0.338$, $p < 0.001$), indicating that those who use a service point are more likely to use bicycle rentals. There is an even stronger positive correlation between service points and bike shops ($r = 0.509$, $p < 0.001$), suggesting that people who use service points are also more likely to use bike shops.

Likewise, there is a strong positive correlation between bicycle rental and bike shop use ($r = 0.459$, $p < 0.001$), implying that people who rent bicycles also frequently use bike shops. However, it is also necessary to mention that in many cases, bicycle rental, bike shop, service point are the same service provider in the same location.

DISCUSSION

The research investigated the service preferences of active tourism participants who choose different forms of active tourism and the sources of information they need. The three clusters identified following statistical data analysis illustrate the differences between the different types of active tourists. Hikers prefer on-site services such as information boards, rest areas and toilets. Those in the second cluster are more modern technology users, relying on digital information sources, mobile apps and websites, while also using traditional services. For cyclists in the third cluster, the provision of adequate cycling infrastructure, service points, bike rental and bike shops are of paramount importance. These results answered the first research question by identifying three distinct clusters with different preferences for services and information sources.

ANOVA analysis showed that these clusters differ significantly in their use of certain services, especially bicycle services, and in their use of digital information sources. The Pearson correlation coefficient analysis confirmed that there are strong correlations between some services, such as meals and toilet use, and some elements of cycling infrastructure.

Our results also answered the second research question, given that different types of active tourism significantly influence the use of certain services and information sources. Based on the above, both hypotheses were confirmed:

(H1): At least three distinct clusters can be identified among active tourism participants, with some groups relying more on traditional information sources, while others prefer more modern, digital tools- TRUE.

(H2): The type of tour significantly influences the use of services and information sources, e.g. cyclists use different services and information sources than hikers or water tourists-TRUE.

CONCLUSIONS

Our study describes how the service needs and the way of obtaining information related to different forms of active tourism are interrelated. The different needs of participants in different types of active tours provide a good indication of the services that need to be developed to best meet the needs of visitors.

Our research is innovative in that it provides a comprehensive analysis not only of traditional on-site services, but also of the use of digital information sources, which is becoming increasingly important in the field of active tourism. The results show that different types of hikers have different preferences in terms of service use, which allows tourism operators to implement targeted improvements for different segments.

The results of the research can be used in other areas of tourism development, as the differences identified by the clusters can help to optimise services in other tourist destinations where active tourism is a priority. The growing demand for digital information sources also highlights the importance of technological developments in tourism.

The results of the research can have a significant impact on the strategies of local and international tourism operators, as an understanding of the different clusters will allow for targeted improvements in tourism services, which will increase the satisfaction and return of active tourists. Developments focusing on cyclists are particularly relevant, as they require different types of services than those offered to hikers on foot or on water. Furthermore, the importance of digital information sources underlines the need for tourism service providers to introduce technological innovations and to digitise information and services on a large scale. However, the research also has limitations, given that the sample size and the focus on the destination under study mean that the results cannot be generalised to all tourist areas, especially those where active tourism plays a less important role, and the research did not examine the seasonality of tourism. The research shows that active tourism participants show different service preferences, especially in terms of information sources.

The three identified clusters use different technological and on-site resources. This provides valuable information for service providers, but it is questionable whether the clusters can be generalised to different tourism contexts, it is a limitation of the research. The results confirm that digital information sources play an important role, especially among tourists using newer technologies. However, the research did not examine in detail how these tools influence the visitor experience or decision-making, but only explored the facts of information source choice. Further analysis could focus on the effectiveness of these tools in enhancing the tourism experience and facilitating decision-making.

Overall, our research represents an important contribution to the development of active tourism and may provide a basis for future research to further explore the links between digital technologies and tourism services.

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