IMPACT OF ONLINE GUIDES AND TECHNOLOGICAL INNOVATIONS ON THE PROMOTION AND VALORIZATION OF THE CULTURAL HERITAGE OF KVARNER

Vedran BRNČIĆ
University of Rijeka,
Faculty of Tourism and Hospitality Management,
Croatia
E-mail: vedran.brncic99@gmail.com

Mislav ŠIMUNIĆ
University of Rijeka,
Faculty of Tourism and Hospitality Management,
Croatia
E-mail: mislavs@fthm.hr

Abstract

Purpose –The purpose of this study is to analyse the role and effectiveness of online guides and advanced digital technologies in the promotion and valorisation of cultural heritage, using the Kvarner region as a case study, with particular emphasis on their impact on user perception and engagement.
Methodology/Design/Approach – The research adopts a mixed-methods design, integrating a qualitative review of relevant scientific literature and digital platforms with a quantitative empirical study conducted on a sample of 202 respondents. Statistical techniques, including descriptive analysis, correlation, and multiple regression analysis, were employed to examine the relationships between the observed variables.
Findings – The findings indicate that websites, social media, and AR/VR technologies exert a statistically significant and positive influence on the promotion and valorisation of cultural heritage. Conversely, mobile applications and artificial intelligence demonstrate limited and statistically insignificant individual effects. The results suggest that the effectiveness of digital tools is contingent upon their level of accessibility, perceived usefulness, and degree of user adoption.
Originality of the research –This study contributes to the existing body of knowledge by offering a systematic and comparative evaluation of multiple digital instruments within a specific regional context, thereby addressing a notable research gap and providing implications for the strategic management of digital tourism and cultural heritage promotion.
Keywords Online guides, Technology, Cultural heritage promotion, Kvarner

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INTRODUCTION

The rapid growth of digital technologies has transformed the tourism industry, particularly in how cultural heritage is represented, marketed, and experienced. Culture is now exchanged not only through traditional, fixed forms of interpretation but also via dynamic, interactive digital systems. Digital interactive tools such as websites, social networks, mobile applications, AI, and AR/VR are becoming essential for destinations to create value and engage with visitors. The shift from passive knowledge reception to active, experience-driven participation reflects broader changes in tourist behaviour and expectations. Today's tourists seek authenticity, interactivity, and emotional engagement, and companies face increasing pressure to develop innovative digital business approaches. Consequently, digital transformation should be a strategic priority for maintaining competitiveness in the tourism sector. However, despite the widespread adoption of digital tools, their effectiveness varies. Some tools, such as websites and social media, have successfully promoted destinations, while others, like mobile apps and AI solutions, are less widely used or do not offer the same benefits. Meanwhile, emerging technologies such as AR and VR have significant potential to create experiential value, but their practical application remains inconsistent. Few studies have examined digitalisation in tourism from multiple perspectives, such as focusing on specific technologies or particular aspects of user experience. There is a lack of well-designed, integrative research that systematically compares digital tools that support the promotion and valorisation of cultural heritage by region. This gap is especially evident in the Kvarner region of Croatia, where cultural heritage is a key component of the tourism offering, yet the strategic use and impact of digital tools have not been extensively studied. Therefore, the aim of this research was to analyse the implications of specific digital tools for the promotion and valorisation of cultural heritage, using the Kvarner region as a case study.

The objective of this study is to provide a quantitative analysis of survey data collected from participants. The results indicate the relative usefulness of various digital tools, highlighting the high significance of websites, social media, and immersive technologies, and the lower usefulness of mobile applications and artificial intelligence. Drawing on insights from tourism, marketing, and digital transformation, the paper broadens the discussion on how digital tools can be strategically incorporated to maximise and enhance the value and competitiveness of cultural heritage destinations. The study offers both scientific contributions and practical implications for organisations and institutions involved in destination management or cultural institutions seeking to improve their digital and communication strategies. Based on the theoretical background and research objectives, the study examines the impact of online guides and other digital tools on the promotion and valorisation of cultural heritage in the Kvarner region.

Accordingly, the following hypotheses are proposed:

H1: Websites providing information on cultural heritage have a positive and statistically significant impact on the promotion of the cultural heritage of the Kvarner region.
H2: The use of social media to gather information on the cultural heritage of the Kvarner region has a positive and statistically significant impact on its promotion.
H3: The use of mobile applications providing information has a positive and statistically significant impact on the promotion of the cultural heritage of the Kvarner region.
H4: The use of artificial intelligence has a positive and statistically significant impact on gathering information about the cultural heritage of the Kvarner region.
H5: The use of AR and VR technologies has a positive and statistically significant impact on the promotion of the cultural heritage of the Kvarner region.

1. LITERATURE REVIEW

The role of digital technologies in tourism has been transformative, affecting both the communication and valorisation of cultural heritage. Digital tools are increasingly important to contemporary tourism as they facilitate information distribution, shape destination perception, and influence how tourists encounter cultural heritage. This shift marks a move from traditional, static promotion to an experience-oriented approach, where tourists play an active role in discovering cultural heritage (Urošević & Rakitovac, 2017). The use of websites, social networks, mobile applications, artificial intelligence (AI), and immersive technologies such as augmented reality (AR) and virtual reality (VR) is now essential to tourism marketing in the industry. In addition to providing information through various channels, these tools enhance engagement, accessibility, and personalisation, and are instrumental in the valorisation of cultural heritage (Diarta, 2017). Consequently, the use of information and communication technologies (ICTs) has become increasingly important for increasing the visibility and appeal of cultural destinations (Tommasi, 2021).

Websites are among the most basic and popular digital tools in tourism advertising. They serve as information conduits and often represent the initial point of contact between a destination and potential visitors. Their effectiveness lies in enabling the production of organised, systematic, and accessible information about cultural heritage, attractions, monuments, and tourism services (Hausmann et al., 2015). Robust web platforms significantly improve accessibility and planning, directly promoting and adding value to cultural heritage.

Social media platforms extend these capabilities by enabling interaction and user-generated content, which fosters ongoing engagement. Research identifies social networks as one of the most influential sources of information for tourism, playing a major role in shaping travel decisions and destination choices (Surla & Miljković, 2023). These platforms create a collaborative environment for users to share experiences, photos, and recommendations, ultimately contributing to destination image and authenticity (Karaca & Polat, 2022). Notably, media such as YouTube have been recognised as effective tourism marketing tools through visual storytelling and user interaction (Tolkach & Pratt, 2021). Influencer marketing leverages mass reach and audience trust to deepen this impact (Sesar et al., 2021).

Although more mobile applications are being developed to enhance visitor experience, their practical effectiveness is often limited. While features such as navigation, context-oriented information, and personalised advice are available, uptake largely depends on usability, usefulness, and perceived value. Research indicates that many mobile applications fail to achieve sustained long-term user engagement, limiting their contribution to the promotion and valorisation of cultural heritage.

AI is being deployed in tourism through chatbots, recommendation engines, and data analysis. Its benefits include increased efficiency, personalisation, and enhanced user interactions (Zlatanov & Popesku, 2019). However, its use in cultural heritage environments remains relatively limited and, in some cases, far less noticeable than in more traditional digital environments today (Spennemann, 2023).

AR and VR (augmented reality and virtual reality) technologies have become highly promising for the digitalisation and valorisation of cultural heritage. These tools can create immersive and engaging experiences that enable users to interact more flexibly with cultural heritage (Garbin Praničević, 2021). Their implementation has the potential to increase visitor engagement, interpretation, and satisfaction. By using visual, spatial, and narrative elements, AR and VR technologies also offer visitors richer ways of experiencing culture. Furthermore, the application of digital data and online platforms to tourism planning has been demonstrated through the use of big data and social network analytics, which clarify visitor behaviour and preferences (Hu et al., 2021).

Online platforms such as TripAdvisor also influence tourism choices through user-generated reviews and sentiment analysis, which affect destination reputation (Valdivia & Herrera, 2017). Despite the growing importance of digital technologies, current research has focused on individual tools rather than presenting a holistic comparative perspective. It does not provide an integrative analysis of the effectiveness of various digital tools in a comprehensive context. This gap is particularly evident in localised contexts, such as the Kvarner region, where cultural heritage is one of a key tourism asset, but the use and impact of digital tools have not been systematically evaluated or implemented.

In this context, the present research contributes to the literature by exploring the comparative relationship between various digital instruments and their effects on the promotion and valorisation of cultural heritage. The research offers insights into the strategic and practical application of digital technology, promotion, and valorisation in tourism and cultural heritage by focusing on a specific location while retaining broader relevance.

2. METHODOLOGY

To address the question of how this study was conducted in Kvarner, it employs a mixed-methods approach, using various research methods to investigate how digital tools affect the promotion and appreciation of cultural heritage in the Kvarner region. The research design incorporates both qualitative and quantitative elements, enabling a more comprehensive analysis of each theory and user perception regarding the use of digital technologies in tourism. The qualitative component relies on analysis of available literature on the topic, professional sources, and online platforms in related fields concerning cultural heritage and tourism promotion. This aspect of the research establishes the theoretical background of digital tools such as websites, social networking sites, mobile applications, artificial intelligence, and immersive technologies, in order to interpret a contemporary perspective on tourism experiences and communication strategies.

The quantitative component is based on structured questionnaires administered to tourists in the Kvarner region and to residents, including those living abroad who are not directly exposed to the local cultural heritage. The survey aimed to gather information on consumer preferences and attitudes, as well as perceptions of how digital tools are used as information sources and for the promotion of cultural heritage. It asks participants about the frequency, degree, and level of use, as well as the overall effectiveness of various digital tools. The sample is demographically diverse, including variables such as age group and education. This diversity allows for a more comprehensive view of user behaviour and perspectives, enhancing the validity of the findings. Participation in the survey was voluntary, and responses were collected anonymously to minimise potential bias. The collected data were analysed using basic statistical techniques, including descriptive analysis and comparison. The analysis focuses on identifying patterns and differences in the perceived efficacy of different digital tools. Particular attention has been paid to comparing how websites, social media, mobile applications, artificial intelligence, and AR and VR technologies contribute to information distribution, user engagement, and the overall promotion and valorisation of cultural heritage. The methodological approach provides an empirical tool for exploring the main trends and correlations among various digital tools regarding their effectiveness in promoting tourism. By incorporating theoretical insights and empirical examples, the research is grounded in the structured foundations it adopts for assessing the impact of digital technology in fostering and valorising cultural heritage, thus paving the way for the analysis in the following sections.

3. FINDINGS

The data from this research provides empirical evidence demonstrating the effectiveness of digital tools for the promotion and valorisation of cultural heritage in the Kvarner region.

Tables 1: **Socio-demographic profile of respondents**

Sample category		
Gender	Male	27,7%
	Female	72,3%
Age	<24	20,3%
	24 – 44	62,9%
	45 - 64	14,4%
	>65	2,5%
Education	Primary school	0%
	High school	38,1%
	Higher education	4,5%
	University degree	57,4%
Employment	Student	5,4%
	Uni. Student	18,3%
	Employed	67,3%
	Unemployed	4,5%
	Retierd	4,5%
Monthly income	Less than 400€	19,3%
	401-600€	5,0%
	601-800€	10,4%
	801-1000€	16,8%
	More than 1001€	48,5%

Source: authors research

Results of the socio-demographic profile of the respondents show that the sample is predominantly female (72.3%), with males comprising 27.7%. Most respondents are aged 24–44 (62.9%), followed by those under 24 (20.3%), those aged 45–64 (14.4%), and those over 65 (2.5%). Regarding education, 57.4% of respondents have a university degree, 38.1% have completed high school, and 4.5% have a higher-level qualification. In terms of employment status, most participants are employed (67.3%), followed by students (18.3%), pupils (5.4%), unemployed individuals (4.5%), and retirees (4.5%). Concerning monthly income, nearly half of the respondents (48.5%) report earning more than €1,001, while the remainder are distributed across lower income categories: 19.3% earn less than €400 per month, 5.0% earn between €401 and €600, 10.4% earn between €601 and €800, and 16.8% earn between €801 and €1,000.

The introductory question also served as a filter, excluding 5.4% of respondents with no experience of the Kvarner region from the statistics. The final sample therefore consists of residents (73.8%) and visitors (20.8%).

Data were analysed using descriptive statistics, where AS represents the mean and SD the standard deviation.

Table 2: **Respondents' attitudes towards websites as sources of information on the cultural heritage of the Kvarner region**

Statement	Mean (AS)	Std. Dev. (SD)
Frequent use of websites	3.57	1.14
Websites help information gathering	3.81	1.07
Influence on visiting cultural sites	3.68	1.12
Influence on attending events	3.63	1.08
Preference over tourist guides	2.98	1.21
Recommendation to others	3.68	1.07
Overall average	**3.56**	**1.11**

Source: authors research

The table shows that respondents frequently use websites to obtain information about cultural heritage (AS = 3.57; SD = 1.14). Websites are considered helpful for gathering information (AS = 3.81; SD = 1.07), which influences decisions to visit cultural heritage sites (AS = 3.68; SD = 1.12) and to participate in cultural heritage activities (AS = 3.63; SD = 1.08). On average, respondents are neutral regarding a preference for websites over traditional in-person tourist guides (AS = 2.98; SD = 1.21), but they are willing to recommend visits to cultural heritage sites based on information obtained from websites (AS = 3.56; SD = 1.07). Overall, respondents generally agree that websites and online guides are a good source of information on the cultural heritage of the Kvarner region (AS = 3.56; SD = 1.11).

Table 3: **Respondents' attitudes about the use of social media for gathering information and promoting the cultural heritage of the Kvarner region**

Statement	AS	SD
The use of social media enables me to access information about cultural heritage more easily.	4,02	1,09
Information about cultural heritage that I find on social media is often useful.	3,88	1,07
Promotional activities related to cultural heritage on social media increase my interest in visiting cultural sites.	3,88	1,11
Social media provide diverse perspectives and information on cultural heritage.	3,97	1,01
Participating in social media activities related to cultural heritage makes me more informed about the region's cultural heritage.	3,66	1,05
Overall average score	**3,88**	**1,06**

Source: authors research

The results in the table indicate that respondents generally agree with the stated claims (AS = 3.88; SD = 1.06). They believe that the use of social media enables easier access to information about cultural heritage (AS = 4.02; SD = 1.09). Respondents also consider information found on social media useful (AS = 3.88; SD = 1.07) and view promotional activities related to cultural heritage on social media positively (AS = 3.88; SD = 1.11). Furthermore, respondents agree that social media provides different perspectives and information about cultural heritage (AS = 3.97; SD = 1.01). They also agree that participation in social media activities makes them more informed about the region's cultural heritage.

Table 4: **Respondents' attitudes towards the use of mobile applications that provide information and promote the cultural heritage of the Kvarner region**

Statement	AS	SD
When visiting and interacting with cultural heritage, I use mobile applications that provide information.	3,01	1,24
The use of mobile applications improves my understanding of cultural heritage.	3,26	1,08
The use of mobile applications encourages me to visit cultural sites that I had not previously planned to visit.	3,38	1,19
Mobile applications are an effective way of promoting lesser-known cultural sites or events.	3,69	1,12
The quality of content in mobile applications is a key factor in the promotion of cultural heritage.	3,62	1,05
I prefer using mobile applications to explore cultural heritage rather than relying on a tourist guide.	2,90	1,22
I would recommend using mobile applications that provide information about cultural heritage.	3,54	1,08
Overall average score	**3,34**	**1,14**

Source: authors research

The results in the table indicate that respondents were, on average, neutral regarding this group of questions (AS = 3.34; SD = 1.14). They neither agree nor disagree about using mobile applications when visiting cultural heritage sites (AS = 3.01; SD = 1.24), and a similarly neutral attitude is observed regarding their role in improving understanding of cultural heritage (AS = 3.26; SD = 1.08).

Respondents also remain neutral on whether they would visit cultural heritage sites in the Kvarner region that they had not previously considered after using a mobile application (AS = 3.38; SD = 1.19). However, they generally agree that mobile applications are a good tool for promoting cultural heritage (AS = 3.69; SD = 1.12) and that the quality of content is a key factor in effective promotion (AS = 3.62; SD = 1.05).

At the same time, respondents show a lower preference for mobile applications compared to a traditional tourist guide (AS = 2.90; SD = 1.22), although they would still recommend the use of mobile applications that provide information about cultural heritage (AS = 3.54; SD = 1.08).

Table 5: **Respondents' attitudes towards the use of artificial intelligence in gathering information about the cultural heritage of the Kvarner region**

Statement	AS	SD
I frequently use artificial intelligence to explore cultural heritage.	2,07	1,14
Artificial intelligence provides relevant information about cultural heritage.	2,07	1,22
Artificial intelligence has made it easier for me to learn about cultural heritage.	2,39	1,28
Thanks to artificial intelligence, I am much more informed about cultural heritage.	2,30	1,24
Artificial intelligence has improved my experience of exploring cultural heritage.	2,37	1,29
Artificial intelligence has significantly contributed to the promotion of cultural heritage.	2,45	1,28
I would recommend using artificial intelligence for exploring cultural heritage.	2,60	1,29
Artificial intelligence is better at presenting cultural heritage than a tourist guide.	2,12	1,17
Overall average score	**2,37**	**1,24**

Source: authors research

As shown in the table, respondents generally disagree with the claims (AS = 2.37; SD = 1.24). Artificial intelligence is not frequently used as a source of information (AS = 2.07; SD = 1.14), and respondents believe it does not provide relevant information about cultural heritage (AS = 2.07; SD = 1.22).

They also report that artificial intelligence has not made it easier to learn about cultural heritage (AS = 2.39; SD = 1.28), nor has it increased their level of knowledge (AS = 2.30; SD = 1.24). Furthermore, respondents believe that artificial intelligence has not improved their experience of exploring cultural heritage (AS = 2.37; SD = 1.29) and has not contributed to its promotion (AS = 2.45; SD = 1.28).

Interestingly, respondents are neutral regarding whether they would recommend the use of artificial intelligence for exploring cultural heritage (AS = 2.60; SD = 1.29). However, they clearly believe that artificial intelligence is not better at presenting cultural heritage than a traditional tourist guide person(AS = 2.12; SD = 1.17).

Table 6: **Respondents' attitudes towards the use of AR (augmented reality) and VR (virtual reality) for exploring and promoting the cultural heritage of the Kvarner region**

Statement	AS	SD
I use AR and VR technologies to gain new knowledge about cultural heritage.	1,94	1,18
AR and VR technologies contribute to the promotion of cultural heritage.	2,64	1,28
The use of AR and VR technologies encourages me to visit cultural sites.	2,38	1,29
AR and VR technologies make my experience of interacting with cultural heritage richer.	2,45	1,32
AR and VR technologies make my interaction with cultural heritage easier.	2,49	1,29
The use of AR and VR technologies encourages me to explore cultural heritage more deeply.	2,41	1,30
I feel more motivated to visit cultural sites in person after using AR and VR technologies.	2,43	1,33
I prefer using AR and VR technologies over a tourist guide when exploring cultural heritage.	2,11	1,16
I would recommend using AR and VR technologies to gain new knowledge about cultural heritage.	2,55	1,31
Overall average score	**2,37**	**1,24**

Source: authors research

Table 6 shows that respondents generally do not use AR and VR technologies to acquire new knowledge about cultural heritage (AS = 1.94; SD = 1.18). They also remain neutral regarding the statement that AR and VR contribute to the promotion of cultural heritage in the Kvarner region (AS = 2.64; SD = 1.28).

Given their limited use, AR and VR technologies do not encourage respondents to visit cultural heritage sites in person (AS = 2.38; SD = 1.29). Respondents also disagree that these technologies enrich their experience of cultural heritage (AS = 2.45; SD = 1.32) or encourage interaction with it (AS = 2.49; SD = 1.29).

Furthermore, AR and VR do not motivate respondents to explore cultural heritage in greater depth (AS = 2.41; SD = 1.30) or to visit cultural sites (AS = 2.43; SD = 1.33). Respondents also show a clear preference for traditional tourist guides person over AR and VR technologies in presenting cultural heritage (AS = 2.11; SD = 1.16).

However, they remain neutral regarding the recommendation of AR and VR technologies for learning about cultural heritage (AS = 2.55; SD = 1.31). Overall, respondents tend to disagree with statements related to the use of AR and VR technologies for the exploration and promotion of cultural heritage (AS = 2.37; SD = 1.24).

Table 7: **Respondents' attitudes towards the valorisation of cultural heritage**

Statement	AS	SD
The use of technological innovations in the promotion of cultural heritage encourages me to revisit, explore more, and recognize the value of cultural heritage	3,43	1,18
The use of online guides and technological innovations to access information about cultural heritage helps me recognize its value	3,50	1,28
The use of online guides and technological innovations encourages me to explore different aspects of cultural heritage and understand their value	3,54	1,29
The use of technological innovations in the promotion and exploration of cultural heritage helps me understand its value	2,46	1,32
The integration of online guides and technological innovations into the presentation of cultural heritage helps promote and enhance the understanding of cultural identity	2,60	1,29
Overall average score	**3,51**	**1,07**

Source: authors research

Based on the table, respondents generally agree with this group of statements (AS = 3.51; SD = 1.07). They are neutral regarding the statement that the use of technological innovations in promoting cultural heritage encourages them to revisit a destination and further recognise its value (AS = 3.43; SD = 1.18). However, respondents agree that using online guides and technological innovations as sources of information helps them understand the value of cultural heritage (AS = 3.50; SD = 1.28). These tools also encourage them to explore and learn more about the cultural heritage of the Kvarner region (AS = 3.54; SD = 1.29). At the same time, respondents remain neutral regarding the statement that the use of technological innovations in promotion and exploration helps them better understand the value of cultural heritage (AS = 3.46; SD = 1.32). Nevertheless, they agree that integrating online guides and technological innovations into the presentation of cultural heritage contributes to both its promotion and the understanding of its value (AS = 3.60; SD = 1.29).

To test the hypotheses, a correlation analysis was conducted, and the Pearson correlation coefficient is shown in the following table.

Table 8: **Correlation analysis**

	Web sites	*Social media*	Mobile apps	AI (Artificial intelligence)	AR (Augmented reality) VR (Virtual reality)	Valorisation
Web sites	1					
Social media	0,681	1				
Mobile apps	0,666	0,688	1			
AI Artificial intelligence	0,376	0,393	0,544	1		
AR (Augmented reality) and VR (Virtual reality)	0,360	0,398	0,506	0,678	1	
Valorisation	0,714	0,737	0,634	0,486	0,518	1

Source: authors research

The correlation analysis revealed a strong, positive, and statistically significant relationship between "websites as a source of information and promotion" and the "valorisation of cultural heritage" ($r = 0.714$; $p < 0.05$). Furthermore, a strong, positive, and statistically significant relationship was identified between "social media as a source of information and a means of promotion" and the "valorisation of cultural heritage" ($r = 0.737$; $p < 0.05$). Additional analysis showed a strong, positive, and statistically significant relationship between "mobile applications that provide information and promote cultural heritage" and the "valorisation of cultural heritage" ($r = 0.634$; $p < 0.05$). The relationship between "artificial intelligence as a source of information" and the "valorisation of cultural heritage" was found to be moderately positive and statistically significant ($r = 0.486$; $p < 0.05$). Finally, a strong and statistically significant relationship was identified between "AR (augmented reality) and VR (virtual reality) used for the exploration and promotion of cultural heritage" and the "valorisation of cultural heritage" ($r = 0.518$; $p < 0.05$). To further test the proposed hypotheses, a multiple regression analysis was conducted, as presented in the following section.

Table 9: **Multiple regression analysis**

Indicators			
Multiple correlation coefficient (R)	0,821		
Coefficient of determination (R^2)	0,674		
Adjusted R^2	0,665		
Standard error	3,556		
F-ratio	80,903		
Significance	0,000		
Independent variables	B	*t*	Sig.
Constant	0,1540	0,178	0,859
Websites as a source of information and promotion	0,3185	5,888	0,000
Social media as a source of information and a means of promotion	0,3924	6,491	0,000
Mobile applications providing information and promoting cultural heritage	-0,0096	-0,190	0,850
Artificial intelligence as a source of information	0,0503	1,319	0,189
AR (augmented reality) and VR (virtual reality) for the exploration and promotion of cultural heritage	0,1035	3,243	0,001

Source: authors research

To determine whether websites, social media, mobile applications, artificial intelligence, and AR (augmented reality) and VR (virtual reality) can predict the additional valorisation of cultural heritage, a multiple regression analysis was conducted. The results indicate that the combination of independent variables significantly predicts the dependent variable ($F = 80.90$; $p < 0.05$).

Specifically, websites as sources of information and promotion ($\beta = 0.319$; $p < 0.05$), social media as sources of information and means of promotion ($\beta = 0.392$; $p < 0.05$), and AR/VR technologies used for the exploration and promotion of cultural heritage ($\beta = 0.103$; $p < 0.05$) explain 67.4% of the variance in the additional valorisation of cultural heritage.

In contrast, other variables – mobile applications as sources of information and promotion, and artificial intelligence as a source of information – show a very small individual impact on cultural heritage valorisation and are not statistically significant ($\beta = 0.0096$; $p > 0.05$; $\beta = 0.0503$; $p > 0.05$).

Furthermore, it can be concluded that websites, social media, and AR/VR technologies have a statistically significant impact on the valorisation of cultural heritage in the Kvarner region, thereby confirming hypotheses H1, H2, and H5. On the other hand, mobile applications and artificial intelligence have a weaker and statistically insignificant impact, leading to the rejection of hypotheses H3 and H4.

Based on the overall analysis, it can be concluded that the use of online guides and modern technological innovations in the promotion of cultural heritage has a positive and statistically significant effect on the valorisation of cultural heritage in the Kvarner region.

4. DISCUSSION

The study findings provide evidence supporting the fact that digital tools play a varied and uneven role in the promotion and valorisation of cultural heritage. For all the technologies considered, some degree of information distribution and visitor engagement is perceived; however, their quality largely depends on accessibility, usability, user experience, and interactivity. This aligns with previous studies, which emphasise that the role of digital technologies in tourism is not uniform across all sectors but is influenced by how they are used in communication and marketing activities (Urošević & Rakitovac, 2017). The dominant role of websites and social media identified in this study corresponds with existing research highlighting their central importance in tourism promotion. As Hausmann et al. (2015) also observed, websites generate accurate, structured, and informed information, which directly affects perceptions of a chosen destination and future travel intentions. They stress the importance of such data in enabling accessibility and efficiency for cultural heritage information.

Nevertheless, social media platforms are also integral to user perceptions and decision-making processes, as they facilitate interaction, content sharing, and real-time communication (Surla & Miljković, 2023). Through social media, users can contribute to the creation and sharing of tourism-related content, thereby increasing both the accuracy and perceived relevance of and information. The results also show a strong influence of visual and user-generated content, which contributes to this trend and may relate to the growing importance of platforms such as YouTube and Instagram. Research suggests that video-based content is important in shaping destination image and generating interest in destinations (Tolkach & Pratt, 2021). Moreover, influencer marketing is becoming increasingly important in tourism promotion, relying on trust and credibility to shape audience behaviour (Sesar et al., 2021).

However, the relatively poor effect of mobile applications reported in the paper aligns with previous studies, which indicate that their success depends on usability and perceived value (Stefanov et al., 2023). Mobile apps offer advanced functionalities, but adoption remains inconsistent, particularly when they do not provide clear advantages over other tools. This demonstrates that technological sophistication alone is insufficient; user-centred design and practical applicability are most important.

For example, the results concerning artificial intelligence (AI) confirm its underdeveloped role in promoting cultural heritage. While AI has significant potential for personalisation and automation, its application remains limited. Previous studies show that AI in tourism is still developing and lacks a strategic application (Zlatanov & Popesku, 2019).

Furthermore, as an extension of these findings, concerns have been raised about interpretation and authenticity in digital environments, where AI-generated content may not always reflect the cultural and contextual depth required for presenting heritage (Spennemann, 2023). This helps explain why respondents view AI as a ‘second place’ product, rather than leading promotional campaigns.

Conversely, the strong perceived capabilities of AR and VR technology are evident, with previous research demonstrating their potential to provide real-world, immersive experiences that appeal to people (Garbin Praničević, 2021). These tools support interpretation and offer innovative ways to engage with cultural heritage, resulting in a deeper and more engaging understanding. However, limited availability and high implementation costs remain the main barriers to adoption, despite their recognised benefits. Additionally, the influence of digital platforms and user-generated data in shaping tourism experiences is acknowledged in existing research on data-driven tourism planning.

Online reviews and systems such as TripAdvisor also affect visitor perceptions through shared experiences and sentiment analysis (Valdivia & Herrera, 2017). These results are consistent with the findings of this review; as these platforms are more accessible and widely used, they play a significant role in influencing tourist behaviour. Overall, this discussion supports the view that it is not only technological capability, but also accessibility, user adoption, user-friendliness, and effective deployment of digital tools which determine their effectiveness.

The findings highlight a clear distinction between widely used, integrated, mainstream tools (websites and social media) and less-used tools (mobile apps and AI), despite their potential applications. At the same time, immersive technologies such as AR and VR appear to be promising areas for future development, particularly in enhancing experience value and interpretation. In practical terms, the implications of these results from the literature are that destination management organisations should focus on building and optimising their most prevalent digital channels, while also investing in emerging technologies to enhance the visitor experience in digital systems. Therefore, a balanced and strategic approach is required to unlock the promotional and valorisation potential of digital tools in cultural heritage tourism.

CONCLUSION

Using the Kvarner region as a case study, this research examines how digital tools influence the promotion and valorisation of the region's cultural heritage. The results show that digital technology plays a significant role in how cultural heritage is presented, perceived, and experienced. However, its effectiveness depends on the type of tool used, its accessibility, and how it is integrated into tourism promotion strategies.

Our findings indicate that websites and social media are the most effective digital promotional tools for cultural heritage. They are central to contemporary tourism marketing due to their widespread use, accessibility, and ability to integrate data and facilitate user interaction. These tools have a strong impact on travel planning, destination image, and visitors' decision-making, confirming their strategic importance. This aligns with previous studies, which emphasise that effective digital communication channels increase visibility and participation (Surla & Miljković, 2023).

Augmented reality (AR) and virtual reality (VR) technologies are also advancing, particularly in enhancing the visitor experience and providing culturally rich interpretations of cultural heritage. Their ability to create engaging, personalised environments contributes to a richer and more productive cultural experience (Garbin Praničević, 2021). Despite their potential, the practical application of these technologies remains limited due to technical and financial barriers.

Currently, mobile apps and artificial intelligence (AI) are less impactful. Although they offer advantages such as customisation and automation, their adoption and practical use remain low. As noted in previous studies, the effectiveness of such technologies depends largely on user acceptance, usability, and strategic implementation by tourist boards and other organisations (Stefanov et al., 2023). This suggests that technological innovation alone is insufficient; it must be aligned with user needs and supported by a coordinated strategy that connects all stakeholders in the digital space. This study aims to contribute by providing a comparative analysis of various digital tools within a single region, thereby addressing a gap in the existing literature. By identifying the most and least effective instruments, the study offers both theoretical and practical insights into the use of digital technologies in cultural heritage tourism.

Statistically, it helps to explain how various digital channels work in synergy with promotion and valorisation processes. Practically, it also informs and guides destination management organisations and cultural organisations in optimising their digital strategies. However, this study had several limitations. As it focused on a specific region with a small population, the generalisability of the findings is questionable. Larger and more representative samples, along with broad-based approaches, would enable more detailed examinations of changes in the use of digital tools and their influence on cultural heritage promotion in future studies. Digital technologies should be seen as one of the pillars for promoting and valorising cultural heritage. Their use depends on an applied and user-friendly strategy, integrating widely used tools with new techniques. Destinations that incorporate digital technologies effectively in their marketing and communication programmes contribute more to enhancing visibility, competitiveness, and tourism value.

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