

ENHANCING SATISFACTION AND RETURN INTENTION THROUGH DIGITAL TECHNOLOGIES IN VIETNAMESE HERITAGE TOURISM: A STRUCTURAL EQUATION MODEL APPROACH

To Minh CHAU¹, Nguyen Phu THANG^{2*}, Nguyen Thi Kim THOA², Nguyen Dang Thao NGUYEN²

¹ An Giang University, Department of Geography, Vietnam National University, Ho Chi Minh City, Vietnam; tmchau@agu.edu.vn (T.M.C)

² The University of Danang, University of Science and Education, Faculty of History, Geography, and Political Science, Da Nang city, Vietnam; npthang@ued.udn.vn (N.P.T); ntkthoa@ued.udn.vn (N.T.K.T); ndtnguyen@ued.udn.vn (N.D.T.N)

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Abstract: Digital technologies are transforming the experience of visitors at heritage sites with deeper discovery, interaction, and interpretation. However, empirical research is still unclear about what technology plays a better role in enhancing tourist satisfaction and loyalty. This study aims to clarify such relationships using an empirical model in investigating tourists at Vietnamese heritage sites. Data were collected using a guided questionnaire from 282 respondents, measuring Perceived Usefulness, Ease of Use, Engagement, Authenticity, Satisfaction, and Return Intention. Using Structural Equation Modeling (SEM), the study explored direct and indirect associations among these constructs. Results showed that Engagement had the strongest positive impact on tourist satisfaction ($T = 3.871$; $p = 0.000$) and that Authenticity was the strongest predictor of intention to return ($T = 2.382$; $p = 0.018$). Satisfaction also positively influenced intention to return ($T = 2.762$; $p = 0.006$), thereby confirming its mediation between experience and behavioral loyalty. Perceived Usefulness and Ease of Use indirectly impacted satisfaction through Engagement. These findings emphasize that interactive, participatory, and real digital experiences are vital in augmenting heritage visits and encouraging repeat visits. Managers of heritage tourism are therefore urged to adopt digital platforms that enhance user engagement, improve storytelling, and improve authenticity perception. By strategic integration of digital tools, destinations have the potential to augment visitor satisfaction as well as competitiveness and sustainability in heritage tourism.

Keywords: heritage tourism, digital technologies, tourist satisfaction, experiences, Structural Equation Modeling

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INTRODUCTION

Heritage tourism is now an important sector within the tourism industry as a whole (Timothy, 2020), and there has been a recent interest in exploring how digital technologies can enhance visitors' experiences (Zollo et al., 2022). Indeed, several digital tools—such as mobile applications, Augmented Reality (AR), and Virtual Reality (VR)—have proved of great value to tourists in engaging them more interactively, with historical sites (Tsao, 2023). These technologies provide not only an immersive experience but also serve as effective channels for educating visitors about a destination's historical, cultural, and artistic significance (Liu & Sutunyarak, 2024). In recent years, there has been growing interest in understanding the impact of digital technologies on tourists' experiences, especially regarding their perceived usefulness (PU), ease of use (EU), engagement (ENG), and authenticity (AUTH) of the experience. Indeed, the Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM) have been separately applied in the evaluation of these factors on tourists' SAT and their return intention (RI) to visit (Sujood & Pancy, 2024). Nevertheless, a few empirical studies integrate these theoretical frameworks in heritage tourism, especially in an emerging market like Vietnam, where tourism is experiencing rapid growth and increased adoption of digital innovations (Nguyen & Nguyen, 2022).

This study, therefore, tries to fill this gap in the literature by investigating the potential of digital technologies in enhancing the heritage tourism experiences of tourists visiting heritage sites in Vietnam. Particularly, we explore how PU, EU, ENG, and AUTH affect Satisfaction (SAT), which eventually impacts the RI of those technologies for visits shortly. Therefore, this study will adopt an SEM approach in testing the relationship among these factors for insight into how digital tools shape tourists' attitudes and behaviors toward heritage tourism.

With a rich cultural heritage, a large number of historical sites, and diverse cultural practices, Vietnam provides a unique context to explore the integration of digital technologies into heritage tourism. Tourism in Vietnam faces many challenges as a developing nation, which involves modernization in its tourism infrastructure, improvement in the quality

* Corresponding author

of experiences for its tourists, and attention to the increasingly demanding travel experiences that are inclusive of education and interactivity (Hoang et al., 2024). Digital technologies can be vital in such directions to improve access and build more interpretative value at heritage sites, thereby aiding more sustainable and engaging tourism. Despite the growth in the usage of digital technologies in heritage tourism globally, there is a relative shortage of research on their impact in the context of Vietnamese tourism. The contribution to the literature consists of an in-depth understanding of how digital tools can be used for enhancing the SAT while visiting heritage sites, ensuring their overall experience and acceptance for a revisit. In addition, this research also provides strong statistical evidence to justify the practical implementation of digital technologies in the management of tourism through testing these relationships with SEM. This research aims to investigate PU, EU, ENG, and AUTH about SAT and RI digital tools in heritage tourism in Vietnam. More precisely, this study seeks to:

- (1) Examine the effect of each variable on the level of SAT.
- (2) Explore how far tourists' SAT influences their RIs to use digital technologies for heritage sites in future visits.

The rest of the paper is organized as follows: Section 2 provides the literature review on digital technologies in heritage tourism, Section 3 describes the methodology and data collection, Section 4 presents the results of the SEM analysis, Section 5 discusses the findings in light of the existing literature, and Section 6 concludes with the practical implications, limitations, and avenues for future research.

LITERATURE REVIEW AND RESEARCH HYPOTHESIS

Heritage tourism digitalization: concepts, tools, and changing visitor expectations

The rapid digitalization of tourism has reshaped the way visitors perceive and engage with heritage environments. Tools such as Augmented Reality (AR), Virtual Reality (VR), mobile applications, and 3D reconstructions have become central to heritage interpretation, allowing visitors to co-create experiences, enhance learning, and strengthen the sense of presence (Choi et al., 2024). These technologies can transform static exhibitions into interactive, immersive narratives that promote engagement and satisfaction. However, findings remain mixed regarding which specific digital affordances best predict satisfaction and behavioral loyalty. While many studies confirm that technology acceptance factors (e.g., usefulness, ease of use) are fundamental, they are not always sufficient to drive repeat visitation unless combined with emotional and experiential dimensions such as engagement and authenticity (Zhang et al., 2025; Tang et al., 2025).

Digital technologies have revolutionised the way visitors plan, experience, and recount their interactions with cultural and historical attractions. In heritage contexts, mobile applications, location-based services, and immersive media (AR/VR, 3D reconstructions) enhance on-site interpretation, tailor routes, and facilitate an interactive narrative that enhances meaning-making and learning outcomes (Bretos et al., 2023).

These affordances redirect the visitor experience from largely passive consumption to co-created, participatory experiences, thus reconceptualising perceived value and satisfaction (Li et al., 2024). Empirically, recent reviews and applied research attest that immersive and social elements of digital experiences generate more intense engagement and more positive attitudes to destinations and museums, particularly among tech-savvy segments. In parallel, post-pandemic recovery has encouraged destinations-especially those in emerging markets-to invest in digital layers that enhance accessibility, inclusivity, and interpretive quality (Torre & Christodoulou, 2021). In the context of Vietnam's rapidly modernizing tourism economy, these instruments resolve long-standing issues around infrastructure and experience quality while promoting sustainable management of vulnerable heritage resources.

Theoretical background and nomological network

The model synthesizes constructs from the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), augmented by modern experience and loyalty theory. In TAM, Perceived Usefulness (PU) and Ease of Use (EU) determine attitudes and downstream intentions toward a technology; TAM extensions prioritize context-specific beliefs and affective states in continuance formation. TPB stresses attitudes, which Satisfaction (SAT) is a proximal proxy in service studies, in motivating Return Intention (RI).

In tourism, this nomological network is typically augmented by experience-focused theory: stimulus-organism-response (S-O-R) to describe how digital stimuli (e.g., interactivity) elicit internal states; flow theory to describe Engagement (ENG) as an intrinsically rewarding absorption; and authenticity theory to describe how visitors assess the cultural "truthfulness" of digitally mediated representations. In heritage settings, these viewpoints intersect: thoughtfully designed digital touchpoints can improve informational value and usability (PU, EU), evoke engaging flow-like states (ENG), and, when sensitively curated-reinforce perceptions of Authenticity (AUTH) instead of detracting from them; these in turn inform overall satisfaction and loyalty-oriented intentions.

Ease of Use (EU) and Perceived Usefulness (PU)

PU captures the degree to which visitors feel that digital technology enhances understanding, learning, and visit quality overall (e.g., timely, context-rich information, meaningful wayfinding, or greater historical insight). In line with TAM, PU is generally a positive predictor of satisfaction and, in some environments, of revisit or continuance intentions (Boboc et al., 2022). In heritage sites, PU builds when AR/VR and mobile guides render complex narratives legible and "present," allowing visitors to place artifacts in larger cultural timelines (Zhang et al., 2022). EU taps into the effort expectancy of using apps, AR markers, or head-mounted displays. Efficient interfaces, intuitive navigation, and consistent performance reduce cognitive load amidst already stimulus-dense visits. Several studies in technology-enhanced tourism find that EU increases immediate satisfaction, but its direct impact on revisit/continuance can be weakened

once the novelty of effortless use dissipates-implicating EU's influence is mainly indirect through satisfaction (Moslehpour et al., 2018). Collectively, previous research leads to the expectation that PU and EU both increase SAT, with PU also sometimes producing a direct push on RI in environments where perceived benefits are salient to future trips.

H1a. Perceived usefulness positively influences satisfaction (SAT).

H1b. Perceived usefulness positively influences return intention (RI).

H2a. Ease of use positively influences satisfaction (SAT).

H2b. Ease of use positively influences return intention (RI).

Engagement (ENG) as an experiential driver

ENG has emerged as a central mediator between technological affordances and visitor satisfaction. Research consistently shows that immersive participation enhances flow, enjoyment, and perceived value (Choi et al., 2024). In museums and heritage environments, AR applications can increase “intertemporal connectedness,” fostering inspiration and emotional resonance that translate into satisfaction and loyalty (Tang et al., 2025).

ENG reflects the level of immersion, involvement, and affective–cognitive engagement provoked by digital content. Interactive narrative, gamified trails (Alamsyah & Wardi, 2020), and AR overlays can translate static observation into an exploratory, meaning-laden experience (Munar & Jacobsen, 2014). Previous evidence indicates that such design decisions lengthen on-site dwell time, prompt curiosity, and spur word-of-mouth actions (Liu et al., 2024).

In heritage tourism, engagement bridges informational depth to emotional resonance, converting abstract historical knowledge into personally memorable moments—an antecedent pathway to satisfaction demonstrated across museum and destination research (Ouyang et al., 2024). Although ENG's most stable effect is on SAT, its direct effect on RI can be less robust unless engagement is combined with other value cues (e.g., authenticity or perceived usefulness) that accompany the visitor into future intention formation. Accordingly:

H3a. Engagement positively influences satisfaction (SAT).

H3b. Engagement positively influences return intention (RI).

Authenticity (AUTH) in digitally augmented heritage experiences.

AUTH has traditionally been viewed as a challenge in digital contexts, yet recent evidence indicates that constructive or virtual authenticity can positively influence satisfaction and loyalty when digital storytelling is transparent and contextually rich (Zhou et al., 2022). The post-pandemic shift in tourism experiences has expanded the concept of authenticity beyond tangible artifacts to include participatory co-creation and hybrid experiences (He et al., 2025). This aligns with recent conceptual models emphasizing authenticity as both a cognitive evaluation and an affective state that motivates return intention (Le et al., 2023; Pazari et al., 2025).

Authenticity-perceived cultural integrity and “truthfulness” of representation-remains the normative lodestar of heritage experiences (Chhabra, 2021). Early critiques worried that digital mediation might trivialize or commodify culture. More recent research, however, demonstrates that when design principles stress fidelity, contextualization, and transparency, digital tools enhance rather than erode authenticity: e.g., 3D reconstructions and AR can reinstate lost architectural layers, situate artifacts within their original milieus, and correct misconceptions (Pietroni & Ferdani, 2021).

Visitors report higher satisfaction when digital narratives clarify provenance, ritual uses, and historical contingencies, making the site’s “aura” more intelligible (King et al., 2016). Importantly, authenticity often exerts a dual role: it contributes to satisfaction (Tian et al., 2020) and can directly prime revisit intention by aligning the experience with deeper identity-work and meaning-making goals that motivate return (Shekhar & Valeri, 2024; Li et al., 2023). Hence:

H4a. Authenticity positively influences satisfaction (SAT).

H4b. Authenticity positively influences return intention (RI).

Tourist Satisfaction (SAT) and Return Intention (RI)

Satisfaction includes both cognitive judgments—such as usefulness, clarity, and efficiency affective judgments, such as enjoyment, engagement, and authenticity-based meaning (Torabi et al., 2022; Seow et al., 2024).. In service and destination studies, satisfaction consistently predicts revisit intention and recommendation behaviors, and functions as a proximal mediator between experience features and loyalty outcomes (Gregoriades et al., 2023). For visitors in digitally enriched heritage settings, those indicating satisfaction are more likely to revisit the same site to take alternative digital trails or to visit other heritage sites offering a similar quality of interpretation (Lin & Rasoolimanesh, 2023).

Empirical research consistently finds the route from satisfaction to revisit intention to be strong (Mittal et al., 2021; Preko et al., 2020) in models including perceived usefulness, enjoyment, engagement, and authenticity; satisfaction often mediates their influence on revisit and continuance intentions. Therefore:

H5. Satisfaction positively influences return intention (RI).

Heritage tourism in emerging markets: why Vietnam matters

Emerging destinations must simultaneously meet mandates to preserve tenuous cultural resources, increase interpretive quality, and vie for sophisticated audiences. Vietnam is a case in point. Post-pandemic rebound spurred investments in digitization to mitigate capacity pressures, enhance wayfinding, and stretch interpretive content across linguistically and culturally heterogeneous segments. Previous research in Vietnam and similar markets connects ICT infrastructure and digital engagement to tourism demand and visitor satisfaction, but integrated, mechanism-level proof in heritage

environments is sparse. Your research fills this lacuna by assessing a theoretically supported SEM linking digital beliefs (PU, EU), experiential states (ENG, AUTH), and consequences (SAT, RI) in an emerging-market heritage environment. Drawing on the above theoretical background and hypotheses, the conceptual framework of the study is illustrated in Figure 1.

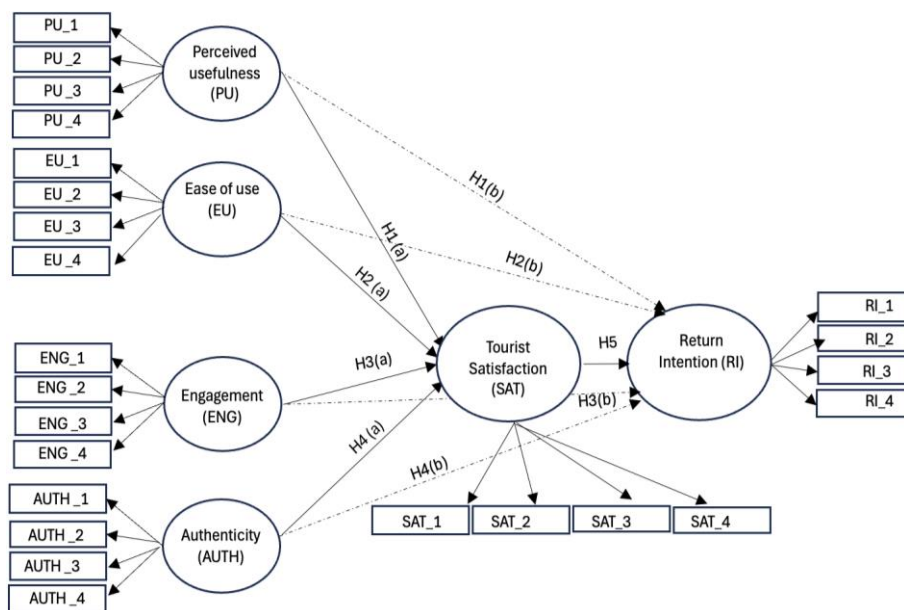


Figure 1. The research model

MATERIALS AND METHODS

Design of research: The study collected data using a convenience sampling strategy. The data collection process of the study involved several key elements, including research design, instrument selection, pilot study implementation, data recording, and data analysis using appropriate approaches. Furthermore, adherence to ethical standards was necessary to ensure participant consent, confidentiality, and privacy (Reja et al., 2003). The content of the questionnaire was built based on the TAM and TBP models (Ajzen, 1991; Sujood & Pancy, 2024), with 4 groups of related factors (Table 1).

Table 1. Profile of respondents (Source: Research results)

	Variable	Sample size (n)	Percentage (%)
Gender	Male	156	55.3
	Female	106	37.6
	Prefer not to say	20	7.1
Age	<18 years old	7	2.5
	18-24 years old	95	33.7
	25-34 years old	97	34.4
	35-44 years old	62	22.0
	45-54 years old	19	6.7
	>55 years old	2	0.7
Education	Less than high school	11	3.9
	High school diploma	84	29.8
	Vocational/Technical certification	36	12.8
	Bachelor’s degree	121	42.9
	Master’s degree	20	7.1
	Doctorate or higher	10	3.5
Employment	Student	81	28.7
	Employed full-time	77	27.3
	Employed part-time	47	16.7
	Self-employed	72	25.5
	Unemployed	3	1.1
	Retired	2	0.7
Annual income level (Vietnam Dong)	Below 10 million VND	92	28.7
	10 million–29 million VND	42	27.3
	30 million–50 million VND	84	16.7
	50 million - 70 million VND	31	25.5
	70 million - 90 million VND	14	1.1
	Above 90 million VND	19	0.7
	Total	282	100

The questionnaire was designed with two main parts: Part 1 stated tourists' views on digital technology in tourism and factors affecting satisfaction and intention to return to heritage tourism destinations. Part 2 was used to collect demographic

information about tourists, including their age, gender, education level, occupation, and income. The questions were designed on a Likert scale from 1-5 according to the SEM model. The questionnaire was then reviewed by 5 tourism experts from the research area. These experts assessed the reliability and applicability of the questionnaire for the study.

Instrument, participants, and data collection: To ensure that the questionnaire was appropriate, the questionnaire was pre-tested with 20 tourists who had experienced heritage tourism sites in Vietnam. The test analyzed the questionnaire’s ease of use, understandability, and overall effectiveness. Based on this assessment, modest changes were made to the structure and wording of the questionnaire, resulting in the final version. A pilot test, involving 20 participants, provided an initial assessment of the questionnaire’s validity and effectiveness. Participant feedback was essential in developing the questionnaire’s structure, flow, and responsiveness (Stoffel et al., 2023).

This iterative process ensured that the final version of the questionnaire was reliable, valid, and capable of collecting important data on the impact of technology in enhancing the heritage tourism experience from the perspective of tourists. The survey was conducted on-site at numerous renowned heritage destinations in Vietnam, including Hanoi, Hue, Hoi An, and My Son. We chose Hanoi, Hue, Hoi An, and My Son to ensure geographic coverage (northern and central Vietnam; coastal-urban vs. inland) and destination diversity (metropolis, imperial heritage city, coastal heritage town, archaeological–religious complex). The sites also differ in market composition, seasonality, and accessibility (airport/rail/road), which are theoretically relevant to visitor experience. Three are UNESCO properties and Hanoi functions as a national gateway, aligning the sampling frame with heritage management priorities.

During their visits, tourists engaged with digital tools such as mobile apps, AR, and VR. To ensure a sufficient number of responses and to account for seasonal fluctuations in tourist behavior, the data collection procedure was conducted over three months (1 May 2024 to 1 July 2024). The questionnaires were made available to visitors who had interacted with digital tools during their visit to the heritage locations, with an emphasis on those who had utilized interactive exhibits, AR/VR technologies, or mobile apps. Due to the nature of the study, visitors who participated in the survey had previous heritage tourism experiences. This allowed tourists to answer the questions knowledgeably, increasing the reliability of their responses. A member of the research team distributed the questionnaires to participants. The study followed the ethical standards of social science research. All respondents were informed about the purpose of the study, assured of confidentiality, and participated voluntarily. The study had a 100% response rate, with all 282 surveys completed and returned. Demographic statistics on participating tourists are detailed in

Data analysis: Data from the survey were analyzed using SEM strong statistical approach that allows the testing of complex relationships among both observed and latent variables (Hair & Alamer, 2022).

The strengths of SEM are that direct and indirect associations between constructs can be estimated to give a detailed view of inter-relationships that may exist between PU, EU, ENG, and AUTH, and their impacts on SAT, and RI digital technologies in the future (Rasoolimanesh et al., 2021).

SEM used in this study is a step-by-step process (Figure 2). It initially formulates hypotheses and model structure, delineating observed and latent variables, and the relationships between them. It then gathers data from 282 heritage tourists via surveys. It estimates the model in SmartPLS version 3.0, where parameters like path coefficients and error terms are computed. The model is evaluated by fit indices (e.g., Cronbach's Alpha, rho_A, Composite Reliability, AVE, VIF) and significance testing (p-values). The results are discussed and compared with previous literature to contribute to heritage-tourism satisfaction knowledge with managerial implications and directions for future research.

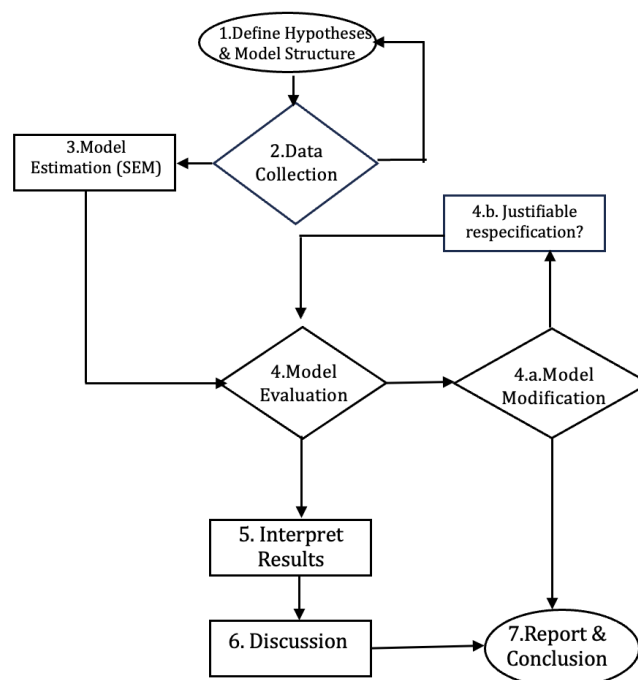


Figure 2. The research process

RESULTS AND DISCUSSION

Measurement model analysis

By applying PLS-SEM, the study carried out two main research steps: Algorithm analysis and Bootstrapping. The results from the Algorithm are shown specifically in Table 2. In the light of Table 2, all the observed variables across "AUTH," "RI," "ENG," "EU," "PU," and "SAT" are above 0.7; thus, reflecting very strong relationships among the observed variables with their respective latent constructs (Hair & Alamer, 2022). To be specific, the range of values was between 0.861 and 0.919, thus explaining that all the observed variables did a good job of explaining their latent variables. Therefore, none of the observable variables must be removed because all are above the minimum threshold set of 0.7.

Table 2. Outer loading, CR, and AVE (N=282)

Construct	Indicators (Meaning)	Factor Loading	Cronbach's	rho_A	Construct reliability CR	Average variance extracted (AVE)
Authenticity (AUTH)	AUTH_1: The use of digital technologies preserves the authenticity of the heritage experience.	0.863	0.905	0.906	0.933	0.778
	AUTH_2: Digital representations of the site (e.g., 3D reconstructions) feel authentic.	0.885				
	AUTH_3: The digital experience does not detract from the site's cultural significance.	0.897				
	AUTH_4: Using technology enhances my appreciation of the site's historical accuracy.	0.882				
Engagement (ENG)	ENG_1: Digital technologies make the visit more interactive.	0.887	0.921	0.921	0.944	0.808
	ENG_2: Augmented Reality (AR) or Virtual Reality (VR) enhances my engagement with the site.	0.899				
	ENG_3: Digital storytelling makes the heritage site more immersive.	0.918				
	ENG_4: Digital tools keep me interested throughout the visit.	0.892				
Ease of Use (EU)	EU_1: It is easy to use digital technologies at heritage sites.	0.861	0.895	0.895	0.927	0.760
	EU_2: Navigating digital tools (apps, AR, VR) is straightforward.	0.871				
	EU_3: The technology is user-friendly even for those unfamiliar with it.	0.877				
	EU_4: I experienced no technical issues using digital tools during my visit.	0.878				
Perceived Usefulness (PU)	PU_1: Digital technologies provide valuable information about the heritage site.	0.897	0.911	0.911	0.937	0.789
	PU_2: Using digital technologies enhances my understanding of the site's history.	0.896				
	PU_3: Digital tools make the visit more educational.	0.891				
	PU_4: Digital technologies improve the overall quality of the tourism experience.	0.869				
Satisfaction (SAT)	SAT_1: I am satisfied with the integration of digital technologies at the heritage site.	0.892	0.927	0.927	0.948	0.820
	SAT_2: My visit met or exceeded my expectations due to digital enhancements.	0.894				
	SAT_3: I would recommend this site to others because of the digital technologies.	0.919				
	SAT_4: The digital experience improved my overall satisfaction with the site.	0.917				
Return Intention (RI)	RI_1: I intend to use similar digital technologies on future heritage tourism trips.	0.876	0.922	0.922	0.945	0.810
	RI_2: I am likely to revisit this site because of the digital tools.	0.918				
	RI_3: I will recommend using digital tools to friends visiting heritage sites.	0.912				
	RI_4: I would choose heritage sites that offer advanced digital experiences.	0.893				

Table 3. Fornell and Larcker

	AUTH	RI	EU	ENG	PU	SAT
AUTH	0.882					
RI	0.797	0.900				
EU	0.798	0.730	0.872			
ENG	0.825	0.769	0.745	0.899		
PU	0.802	0.755	0.711	0.791	0.888	
SAT	0.803	0.788	0.778	0.816	0.779	0.906

Table 4. HTMH

	AUTH	RI	EU	ENG	PU	SAT
AUTH						
RI	0.871					
EU	0.886	0.803				
ENG	0.904	0.833	0.821			
PU	0.882	0.823	0.788	0.863		
SAT	0.875	0.852	0.853	0.882	0.847	

Based on the data provided and the guidelines from Hair & Alamer (2022), the reliability and validity of the constructs are as follows: the Cronbach's Alpha values for all constructs are within the range of 0.895 to 0.927, well above the acceptable threshold of 0.7, which indicates that each construct is internally consistent. Similarly, the rho_A values range from 0.895 to 0.927, thus establishing the reliability of the constructs, and these values are close enough to Cronbach's Alpha values for further assurance of the robustness of the scale reliability. The Composite Reliability values ranged from 0.927 to 0.948, thus falling within the ideal range of 0.7 to 0.9, which suggests that all the constructs were highly reliable. According to Hair & Alamer (2022), values above 0.7 are considered optimal for general research, and in this case, the data shows excellent reliability. Finally, the AVE values range from 0.760 to 0.820, all beyond the threshold recommended value of 0.5, confirming that the constructs achieve convergent validity, which means that latent variables explain a sufficient proportion of variance in observed variables. Besides that, the data from both the Fornell and Larcker criterion and the HTMT method (Table 3.4) indicate that discriminant validity exists in the model since the square roots of AVE are higher than the correlations between constructs, and the HTMT values are below the threshold of 0.85. This would therefore mean that the constructs are distinct enough from each other.

Structure model analysis

Whether the path coefficient of any relationship signifies or does not, which tells its statistical significance, depends upon its standard error derived through the Bootstrapping method. Through the bootstrapping error, one can work out the value of the T-test and the P-value of all the path coefficients in the structural model. Generally, the value considered for a test of significance in this research is 5%=0.05. If the P-Coefficients result in the impact relationship reveals that the p value < 0.05, then the impact is statistically significant; otherwise not (Hair & Alamer, 2022).

Table 5. Path coefficients

Paths		Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Hypothesis
H4 (b)	AUTH -> RI	0.273	0.272	0.115	2.382	0.018	Supported
H4 (a)	AUTH -> SAT	0.160	0.157	0.078	2.058	0.040	Supported
H2 (b)	EU -> RI	0.097	0.098	0.072	1.348	0.178	Not Supported
H2 (a)	EU -> SAT	0.258	0.254	0.079	3.281	0.001	Supported
H3 (b)	ENG -> RI	0.132	0.131	0.094	1.399	0.162	Not Supported
H3 (a)	ENG -> SAT	0.327	0.331	0.085	3.871	0.000	Supported
H1(b)	PU -> RI	0.158	0.159	0.075	2.122	0.034	Supported
H1(a)	PU -> SAT	0.208	0.212	0.071	2.917	0.004	Supported
H5	SAT -> RI	0.263	0.265	0.095	2.762	0.006	Supported

Table 5 and Figure 3 display the result of path coefficient analysis in the context of the SEM approach for digital technologies' contribution to facilitating SAT and RI in heritage tourism. According to the data, the path coefficients can be assessed for statistical significance using the T-statistics and P-values calculated by the Bootstrapping method. In general, the minimum threshold of P-value considered statistically significant is usually less than 0.05, while a T-statistic value greater than 1.96 (|O/STDEV|) can be said to be statistically significant at a 5% level. The result presents strong correlations among several factors influencing both SAT and the use of digital tools in the future.

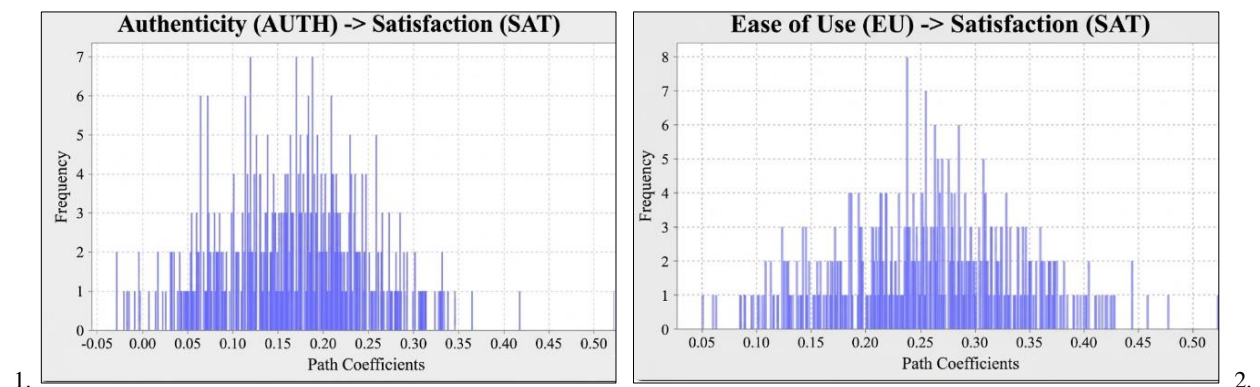


Figure 3. Histograms of path coefficients (1, 2)

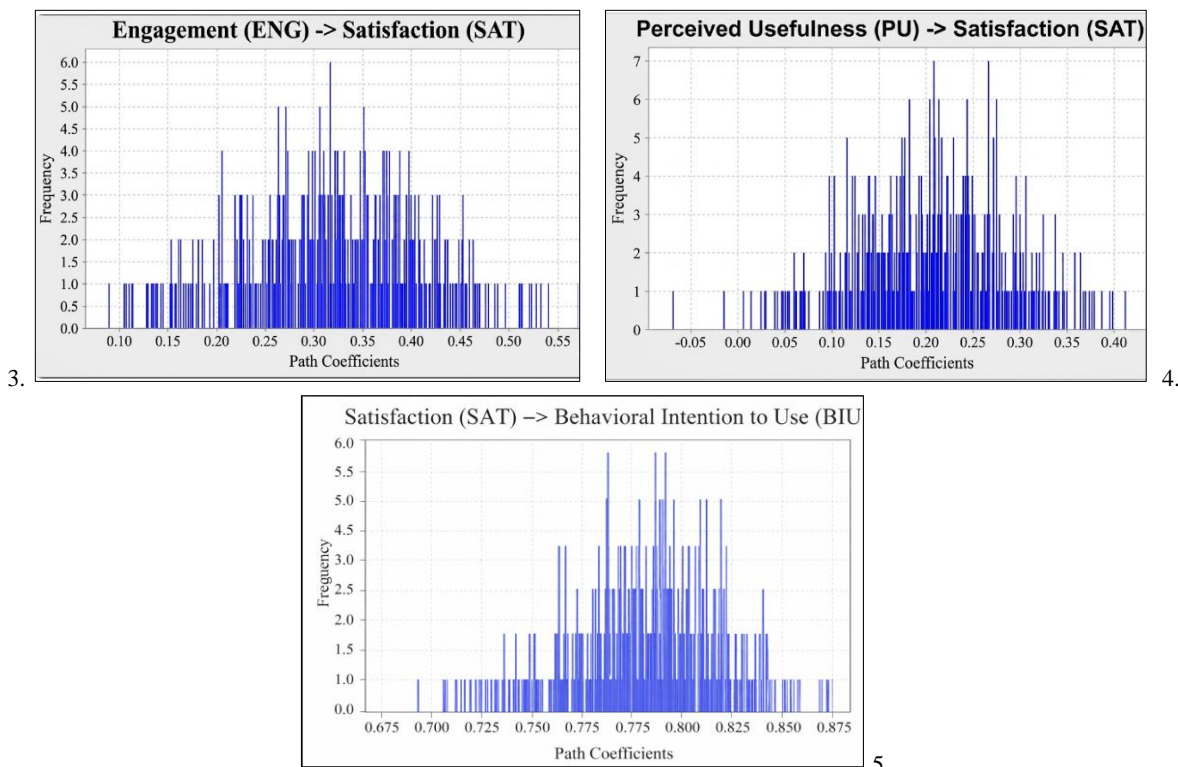


Figure 4. Histograms of path coefficients (3, 4, 5)

Authenticity (AUTH) positively and significantly influences both SAT and RI. Especially, the path coefficient of AUTH-SAT is 0.160, and the T-value is 2.058 ($p = 0.040$), indicating that AUTH plays a very critical role in improving SAT. Besides, AUTH also plays a significant role in RI digital tools (path coefficient = 0.273, T-value = 2.382, $p = 0.018$), showing that tourists are more likely to use digital technologies if they believe that the experiences are authentic.

The results are consistent with Mosbeh (2025), who underscored the essential role played by tourists' experience of authenticity at heritage destinations on revisit intention. Authentic experiences promote digital engagement, and therefore, they are instrumental in maintaining interest in heritage tourism.

Ease of use (EU) also has a positive influence on SAT, with a path coefficient of 0.258 and a T-value of 3.281 ($p = 0.001$), highlighting that easy-to-use digital tools play an important role in a good tourism experience. The EU and RI are not statistically significant ($p = 0.178$), which means that the EU increases SAT but does not have a direct impact on the intention to return or keep using digital tools. This is consistent with Wang et al. (2024), whose research concluded that while the EU is essential in adopting technology, on its own, it does not guarantee sustained usage for heritage tourism.

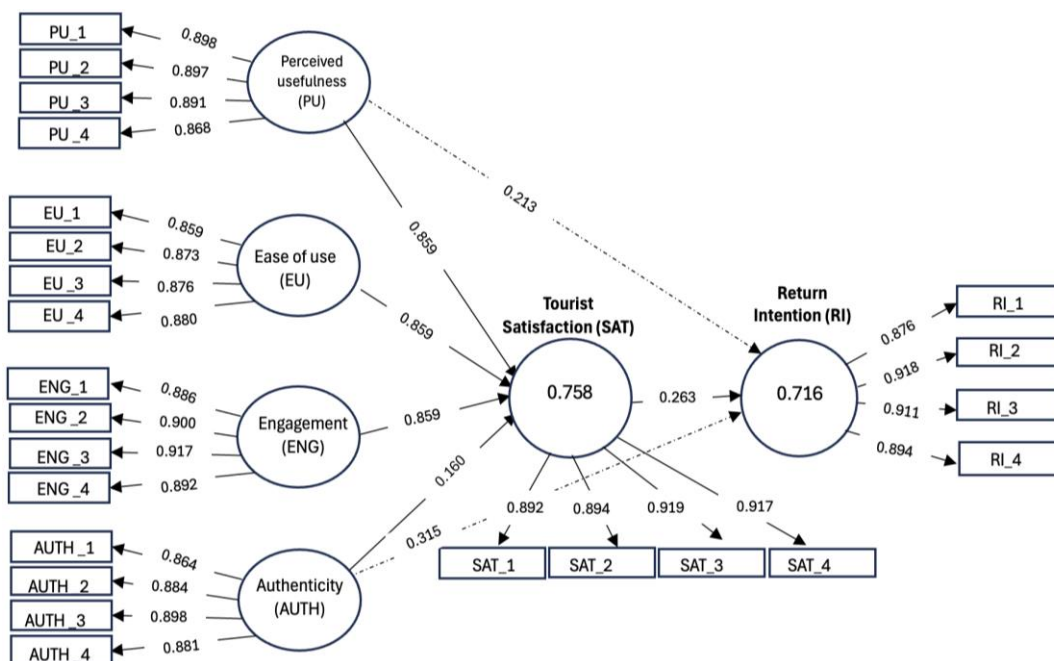


Figure 5. The PLS-SEM of the factor driving SAT and RI (Bootstrapping)

Both Engagement (ENG) and Perceived Usefulness (PU) have meaningful impacts on SAT. ENG exerts a path coefficient of 0.327 ($p = 0.000$), while PU has a path coefficient of 0.208 ($p = 0.004$), indicating both contribute to enhancing SAT. Peng et al. (2023) agree that PU and ENG increase immediate SAT but do not necessarily lead to repeat visits unless combined with affective variables like authenticity. However, neither PU nor enjoyment has any significant effect on digital tool intention to return ($p = 0.162$ and $p = 0.034$, respectively), suggesting that even though they both increase SAT, they have no direct effect on tourists' subsequent adoption of digital technologies.

Finally, satisfaction (SAT) is also a significant determinant of RI digital tools, with a path coefficient of 0.263 and a T-value of 2.762 ($p = 0.006$). This proves that satisfied tourists will come back and continue to use digital tools in heritage tourism. This is in line with the TPB (Ajzen, 1991), which predicts that SAT is one of the main drivers of future intentions. In tourism, satisfied travelers have a higher tendency to revisit. Luo et al. (2024) also emphasize that the SAT is an important element in encouraging repeat visits to digitally augmented tourism experiences (Figure 4).

Lastly, AUTH, EU, ENG, and PU influence SAT and SAT significantly to predict RI. EU and ENG, however, do not solely drive future use intentions, which is proof that such interactions in heritage tourism are multifaceted (Figure 5).

Our results align with and extend prior research on technology-mediated tourism experiences. Consistent with the Technology Acceptance Model (Davis, 1989) and recent tourism studies (Chung et al., 2022; Fang et al., 2023), PU was a robust predictor of satisfaction, confirming that visitors value digital tools when they provide substantive interpretive benefits. Moreover, the mediating role of satisfaction in the PU → RI pathway supports findings by Chen & Rahman (2018), who emphasized satisfaction as the key driver of revisit intention.

However, our findings also diverge from some earlier conclusions. Unlike studies that reported a significant direct effect of ease of use on revisit intention in general tourism apps (Li & Wang, 2021), our data suggest that in heritage settings, usability functions more as a hygiene factor than as a loyalty driver-likely because visitors prioritize cultural value and meaningfulness over mere convenience. Additionally, while early scholarship raised concerns that digital mediation might undermine authenticity (MacCannell, 1973), our results corroborate more recent evidence (Su et al., 2021) indicating that digitally enhanced authenticity can strengthen both satisfaction and return behaviors when executed with cultural integrity.

Several mechanisms can explain these findings. First, PU's dominance reflects visitors' desire for value-adding functionalities in heritage contexts: digital tools that clarify historical narratives, personalize tours, and contextualize artifacts enrich cognitive and emotional engagement, thereby fostering satisfaction. Second, ENG's strong effect on satisfaction illustrates how immersive experiences stimulate intrinsic enjoyment and deeper connection, consistent with flow and S-O-R theories (Csikszentmihalyi, 1990; Mehrabian & Russell, 1974). Third, the unique role of AUTH indicates that authenticity is not only preserved but actively constructed through careful digital curation-such as transparent reconstructions and context-rich storytelling-which engenders trust and identity alignment, critical antecedents of revisit intentions in heritage tourism. Together, these mechanisms suggest that technology's impact in heritage settings hinges on its ability to enhance meaning rather than simply deliver convenience.

CONCLUSION

This study provides empirical evidence that digital technologies significantly enhance tourist satisfaction and return intention in heritage tourism. Specifically, perceived usefulness (PU), engagement (ENG), and authenticity (AUTH) emerged as the most influential drivers of satisfaction, while authenticity exerted a unique direct effect on return intention. Ease of use (EU), although contributing to satisfaction, did not show a strong direct effect on loyalty intentions, suggesting that baseline usability alone is insufficient to secure repeat visits. These findings collectively highlight the central role of satisfaction as a mediator linking digital affordances to behavioral loyalty outcomes in culturally sensitive destinations.

Theoretically, this study bridges technology acceptance, experiential engagement, and authenticity theory within a single structural model, offering a comprehensive explanation of how digital affordances translate into loyalty outcomes in heritage tourism. By empirically demonstrating authenticity's dual pathway (to satisfaction and directly to return intention), it advances scholarly debates on the evolving nature of authenticity in digitally mediated cultural experiences.

Practically, the findings inform destination managers and policymakers that investments in digital tools should prioritize content-rich, culturally grounded solutions. Enhancing usability alone is insufficient; emphasis must be placed on authentic storytelling, immersive design, and satisfaction-driven strategies. These insights are especially valuable for emerging markets like Vietnam, where digitalization can compensate for infrastructure gaps while safeguarding cultural heritage.

Despite its contributions, this study has limitations. The cross-sectional design restricts causal inference; future longitudinal or experimental research could better capture dynamic changes in perceptions over time. The sample's geographic and cultural specificity (Vietnam) limits generalizability; replication in diverse heritage contexts would strengthen external validity. Additionally, unexamined variables such as cultural values, prior digital literacy, or trust in technology may moderate the observed relationships and warrant future exploration.

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