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Virtual Reality and Gen Z in Cultural Tourism: Modelling Memorable Experiences and Tourist Intention

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Abstract: The decline in Generation Z's interest in Cultural Heritage Tourism has become a critical concern globally. This study investigates how Virtual Reality (VR) can foster engagement among Gen Z by creating memorable and emotionally rich virtual heritage experiences. Using a quantitative approach, 425 Gen Z respondents participated in virtual tours of Borobudur Temple. PLS-SEM was applied to test a model linking telepresence, emotional involvement, and enjoyment to memorable tourism experience (MTE) and continuance intention. Results reveal that enjoyment and emotional involvement significantly influence MTE and continuance intention, with MTE serving as a key mediator. The findings highlight the need to go beyond technological immersion and focus on affective and hedonic gratifications to ensure sustainable engagement. This study offers practical insights for VR developers and cultural institutions, and contributes theoretically by integrating Flow Theory and Uses and Gratifications Theory to explain Gen Z's engagement with virtual cultural heritage.

Keywords: Virtual Reality; Generation Z; Cultural Tourism; Memorable Tourism Experience; Continuance Intention

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Resumen: La disminución del interés de la Generación Z por el turismo de patrimonio cultural es una preocupación global. Este estudio explora cómo la Realidad Virtual (RV) puede aumentar el compromiso al ofrecer experiencias virtuales memorables y emocionalmente intensas. Se utilizó un enfoque cuantitativo con 425 participantes de la Generación Z en recorridos virtuales del Templo de Borobudur. Se aplicó PLS-SEM para analizar la relación entre telepresencia, implicación emocional y disfrute con la experiencia turística memorable (ETM) y la intención de continuidad. Los resultados muestran que el disfrute y la implicación emocional influyen significativamente en la ETM y la intención de continuidad, con la ETM como mediador clave. Se concluye que es esencial ir más allá de la inmersión tecnológica y centrarse en gratificaciones afectivas y hedónicas para garantizar un compromiso sostenible. Este estudio ofrece aportaciones prácticas para desarrolladores de RV e instituciones culturales, y contribuye teóricamente integrando la Teoría del Flujo y la Teoría de Usos y Gratificaciones para explicar el compromiso de la Generación Z con el patrimonio cultural virtual.

Palabras Clave: Realidad Virtual; Generación Z; Turismo Cultural; Experiencia Turística Memorable; Intención de Continuidad

1. INTRODUCCIÓN

The declining interest of Generation Z (Gen Z) in Cultural Heritage Tourism (CHT) has become a critical issue in the tourism industry. Several countries in Europe, the UK, and Asia have experienced a decline in Generation Z's interest in cultural heritage tourism. In France and Spain, young travelers are increasingly shifting to lesser-known destinations, indicating a reduced interest in traditional heritage sites (Shabani, 2024). Across Europe, 31% of young people are uninterested in cultural heritage activities, while 37% feel they do not have enough time to participate (Vegheș, 2019). In Scotland, UK, only 16% of those aged 16-24 show interest in cultural tourism (J. Morrison, 2019). In Indonesia, globalization is eroding traditional norms and customs, leading to a decline in Generation Z's engagement with cultural heritage tourism (Sormin & Sihombing, 2023). In Southeast Asia, urbanization has led to the loss of traditional buildings and practices, making cultural heritage less accessible and relevant to younger generations (Chandran, 2019). Unlike previous generations who exhibited strong enthusiasm for direct cultural exploration, Gen Z tends to disengage from conventional heritage tourism due to perceived lack of interactivity and relevance to their digital-driven lifestyles (Loureiro et al., 2019; Melo et al., 2022). This declining engagement presents a major challenge, as cultural heritage sites serve not only as tourism attractions but also as essential elements in preserving national identity, fostering historical education, and contributing to the economic sustainability of the tourism sector (Djukardi et al., 2020; Mendoza & Talavera, 2025). If this trend continues, cultural heritage may lose its appeal among younger generations, threatening both its conservation and the economic viability of CHT-dependent destinations. This generational shift toward digital consumption suggests that new technological approaches, such as Virtual Cultural Heritage Tourism (VCHT), could bridge the gap between Gen Z's digital engagement preferences and cultural heritage appreciation. To address this issue, innovative strategies that align with Gen Z's digital preferences must be implemented.

One emerging solution is Virtual Cultural Heritage Tourism (VCHT), which leverages Virtual Reality (VR) technology to create immersive and interactive experiences. VR enables users to virtually explore cultural heritage sites, interact with digital reconstructions, and engage in simulated heritage experiences without physical travel (Bozzelli et al., 2019). As digital technologies continue to reshape the tourism industry, VR has been widely adopted in various domains, including education, marketing, and entertainment (Nayyar et al., 2018). Studies have demonstrated that VR enhances user engagement by facilitating telepresence, interactivity, and realism, leading to more memorable experiences (Bogicevic et al., 2019). However, despite its potential to attract Gen Z, the key challenge remains: how to ensure that VR experiences in cultural heritage tourism foster long-term engagement rather than being a one-time novelty. If sustainable engagement is not achieved, VCHT risks becoming an ephemeral trend rather than a meaningful alternative to traditional CHT experiences.

In digital engagement research, Flow Theory (Csikszentmihalyi, 1990) and Uses and Gratifications Theory (UGT) (Katz et al., 1974) have been extensively applied to understand user interactions with digital environments. Flow Theory describes a state of deep involvement where individuals experience intense focus, a sense of control, intrinsic motivation, and a loss of self-consciousness (Csikszentmihalyi, 1990; Skadberg & Kimmel, 2004). While Flow Theory explains the immersive aspects of VCHT, UGT provides insight into the motivations that drive users to continue engaging with VR heritage tourism. UGT explains how individuals actively choose media based on specific gratifications, such as entertainment, exploration, emotional engagement, and social interaction (Dolan et al., 2016). Both theories had been widely applied in studies examining media usage motivation, including social media (Whiting & Williams, 2013), video games (Sherry, 2013), augmented reality (Rauschnabel, 2018), and VR tourism (M. J. Kim, Lee, & Jung, 2020). Research by Lim & Kumar (2019) suggests that Gen Z prioritizes entertainment and interactive experiences over purely informational content. If VR-based experiences provide meaningful gratifications, users are more likely to develop sustained engagement and revisit similar content in the future (Sagnier et al., 2020).

Despite their extensive application in digital engagement research, Flow Theory and UGT remain insufficient in explaining long-term engagement within VCHT. Flow Theory predominantly emphasizes immersion, challenge, and skill balance but does not fully account for the role of emotional engagement and social connection in VR tourism (Shin, 2018). Most studies on flow have focused on task-oriented digital activities such as gaming, online shopping, and e-learning (B. Kim et al., 2020; Novak et al., 2000), leaving a gap in understanding how emotionally charged experiences contribute to Memorable Tourism Experiences (MTE) in VCHT. Similarly, UGT provides a valuable framework for understanding initial motivations for media usage but lacks depth in explaining how gratifications evolve into sustained behavioral patterns (Ruggiero et al., 2021). Prior research has primarily examined gratifications as static factors that influence media selection, without considering how they transform into emotionally significant (Lim & Kumar, 2019). Additionally, existing UGT-based studies on VR tourism have primarily focused on utilitarian motivations, such as educational benefits and accessibility, rather than hedonic motivations like enjoyment and emotional resonance (M. J. Kim & Hall, 2019; Sagnier et al., 2020). Although Flow Theory and UGT have been widely applied in digital engagement research, they have yet to be integrated to explain long-term engagement in VCHT. Understanding these gaps is crucial for identifying how VCHT can create emotionally immersive and memorable experiences that lead to long-term engagement among Gen Z users.

To address these theoretical and practical gaps, this study formulates the following research questions:

(1) How do telepresence, emotional involvement, and enjoyment contribute to the formation of MTE in VCHT?

(2) How does MTE influence continuance intention in VCHT usage?

(3) Does MTE mediate the relationship between experiential factors and continuance intention in VCHT?

2. LITERATURE REVIEW

Flow Theory and Uses and Gratifications Theory (UGT) offer complementary perspectives in understanding how VR-based tourism enhances user engagement and influences long-term behavioral intentions. Flow Theory, introduced by Csikszentmihalyi (1990), describes a state of deep absorption in an activity, where individuals experience intense concentration, intrinsic enjoyment, and a loss of self-awareness. This theory has been widely applied in interactive digital environments, including e-learning (Hamari et al., 2016), gaming (Shin, 2018), and digital media experiences (Novak et al., 2000). Flow is characterized by a seamless sense of control, focused attention, and intrinsic motivation to continue engagement (Hoffman & Novak, 1996).

In Virtual Cultural Heritage Tourism, VR fosters immersive environments that support the flow state, allowing users to feel a heightened sense of presence and deep engagement with cultural exploration (Shin, 2018). Research indicates that immersive VR experiences enhance emotional involvement, increase enjoyment, and create more memorable tourism experiences (MTE) (D. Kim & Ko, 2019; Knežević et al., 2018). Furthermore, Berto (2014) found that immersion in digital environments significantly strengthens users' emotional engagement, reinforcing the role of VR in shaping meaningful tourism experiences. This suggests that flow plays a crucial role in ensuring that virtual tourism is engaging, emotionally satisfying, and memorable.

While Flow Theory explains how users experience engagement and enjoyment in VR tourism, UGT helps identify the underlying motivations driving their adoption and continued use of the technology. Originally developed by Katz et al (1974), UGT posits that individuals actively select and use media based on their needs and expectations (Dolan et al., 2016; Rauschnabel, 2018). Unlike traditional media theories that assume passive consumption, UGT highlights users' agency in choosing technology based on gratifications sought (GS) and gratifications obtained (GO) (Lim & Kumar, 2019). Research shows that GS influences initial adoption, whereas GO determines continued engagement (Eighmey & McCord, 1998; Lee & Cho, 2020).

In Virtual Cultural Heritage Tourism, users engage with VR tourism for various reasons, including cultural exploration, education, entertainment, and social interaction (Bandyopadhyay & Ray, 2019). If VR tourism effectively fulfills these needs, users are more likely to continue using it in the future (M. J. Kim, Lee, & Preis, 2020), and emphasize that user motivations in VR tourism adoption vary based on expectations, ranging from immersive learning experiences to entertainment-driven engagement.

3. HYPOTHESIS DEVELOPMENT

3.1. Telepresence and MTE

In immersive digital experiences, one of the most critical factors shaping user engagement is telepresence—the perception of "being there" in a mediated environment In virtual tourism, telepresence is valued for its ability to simulate spatial presence akin to physical travel (Willems et al., 2019). When users experience telepresence, they feel as if they are truly exploring the cultural site, rather than passively observing digital content (Sun et al., 2021).

Previous studies highlight that telepresence enhances immersion, emotional involvement, and memory recall. In VR-based learning, it leads to deeper cognitive processing and stronger retention (Berto, 2014). In entertainment settings, higher telepresence increases enjoyment and meaningful engagement, fostering lasting impressions (Yang et al., 2023). However, despite these findings, its direct impact on Memorable Tourism Experience (MTE) in virtual cultural heritage tourism is still underexplored.

In the VCHT context, a heightened sense of presence can intensify emotional responses, stimulate interaction, and improve overall experience quality experience (Lee & Cho, 2020). Since MTE reflects depth of engagement and experiential impact, it is reasonable to hypothesize

H1: Telepresence positively influences Memorable Tourism Experience (MTE) in Virtual Cultural Heritage Tourism.

3.2. Emotional Involvement and MTE

Beyond the sense of presence, another crucial factor in shaping memorable tourism experiences is emotional involvement—the extent to which users feel emotionally connected and invested in the experience (Chakraborty et al., 2020). Emotionally rich digital interactions are more likely to be remembered and valued (Rojas-Sánchez et al., 2023), as they influence how users interpret and internalize experiences (M. Zhou & Wang, 2024).

In traditional tourism, emotional involvement contributes significantly to satisfaction, place attachment, and revisit intentions (Prayag et al., 2017). When travelers feel emotionally connected to a destination—through cultural meaning, personal relevance, or uniqueness—they are more likely to view the experience as meaningful. In VCHT, such emotional connections may arise through narrative richness, interactivity, and authenticity.

Research in VR contexts shows that greater emotional involvement leads to deeper content engagement and stronger memory (Allcoat & von Mühlenen, 2018). While this has been supported in entertainment and educational VR, its specific role in virtual cultural heritage tourism remains underexplored. Therefore, we propose:

H2: Emotional Involvement positively influences Memorable Tourism Experience (MTE) in Virtual Cultural Heritage Tourism.

3.3. Enjoyment and MTE

Enjoyment is a core concept in Flow Theory, describing the intrinsic pleasure and satisfaction that arise during engaging activities (Csikszentmihalyi, 1990). In digital contexts, it plays a vital role in sustaining attention and enhancing the perceived quality of experiences (D. Kim & Ko, 2019). Enjoyment also influences user valuation and behavioral intention (Idogawa et al., 2023).

In VCHT, enjoyment can emerge from interaction, immersive design, and gamification. Compared to passive learning, VR offers more dynamic and engaging formats for cultural exploration (Cecotti, 2022). These features enhance emotional connection, immersion, and retention of information (Frenzel et al., 2009), which are essential for building memorable experiences (Bekele et al., 2018).

While the link between enjoyment and engagement is well-documented in gaming and educational VR, its influence on MTE in virtual cultural heritage remains underexplored. Since enjoyment contributes to emotional depth and user satisfaction, it is reasonable to expect a positive relationship between enjoyment and the formation of memorable virtual tourism experiences.

H3: Enjoyment positively influences Memorable Tourism Experience (MTE) in Virtual Cultural Heritage Tourism.

3.4. MTE and Continuance Intention in Virtual Cultural Heritage Tourism

Memorable Tourism Experience (MTE) has long been identified as a critical predictor of satisfaction, destination attachment, and behavioral intentions in traditional tourism (Rasoolimanesh et al., 2021). MTE is shaped by sensory engagement, environmental stimuli, and social interactions during travel, with factors like cultural authenticity and emotional connection playing significant roles (Lee & Cho, 2020).

With the growth of Virtual Cultural Heritage Tourism (VCHT), the question arises whether MTE in virtual settings has a similar effect on user behavior. Immersive digital experiences are now capable of delivering emotional resonance and perceived authenticity. Yet, empirical evidence on whether these experiences motivate continued engagement remains limited (H. Song & Lu, 2024).

Studies in digital media and VR show that users who perceive virtual experiences as high-quality and memorable demonstrate stronger continuance intention (Z. Zhou et al., 2012; Hamari et al., 2016). According to Uses and Gratifications Theory (UGT), individuals engage with media to fulfill specific goals and are more likely to continue using it if they derive gratification, such as enjoyment or learning (Eighmey & McCord, 1998; Katz et al., 1974). In VCHT, these gratifications can be reinforced when the experience is perceived as meaningful and memorable (Tussyadiah et al., 2017).

Although MTE's effect on continuance is well-documented in physical tourism, its role in virtual contexts is still underexplored. Nevertheless, it is plausible that memorable experiences in VCHT strengthen users' intention to revisit or continue using the platform. Thus, we propose:

H4: Memorable Tourism Experience (MTE) positively influences Continuance Intention (ITU) in Virtual Cultural Heritage Tourism.

3.5. Telepresence and Continuance Intention in Virtual Cultural Heritage Tourism

In digital contexts such as VR learning and entertainment, higher telepresence strengthens psychological involvement, user satisfaction, and behavioral intention (Zahid et al., 2024). A heightened sense of spatial realism enhances immersion, leading to deeper emotional and cognitive engagement (Safikhani et al., 2024).

Studies in VR education emphasize telepresence as a factor driving retention through improved focus, authenticity, and interaction (Cho & Lee, 2022). In VR tourism, it simulates the sensation of physical presence, shaping users' willingness to revisit or continue using the platform (K. S. Song et al., 2007). Tourism marketing studies also associate high telepresence with increased travel intention (Marasco et al., 2018), implying similar behavioral effects in Virtual Cultural Heritage Tourism (VCHT).

Although the specific relationship between telepresence and continuance intention (ITU) in virtual tourism remains underexplored, its role in strengthening engagement across VR experiences supports the following hypothesis:

H5: Telepresence positively influences Continuance Intention (ITU) in Virtual Cultural Heritage Tourism.

3.6. Emotional Involvement and Continuance Intention in Virtual Cultural Heritage Tourism

Emotional involvement reflects the extent to which users develop affective connections with a virtual experience, shaping engagement, satisfaction, and behavioral outcomes (D. Kim & Ko, 2019). Research on digital tourism and immersive media shows that emotionally engaging content enhances user retention and willingness to continue using a platform (Cheng, 2021).

In physical tourism, emotional bonds with destinations predict revisit intentions and loyalty (W. K. Chen et al., 2020). In digital contexts, users who feel emotionally connected to a virtual environment are more inclined to return, whether to re-experience familiar content or discover new aspects (Dai et al., 2020). However, because VR is mediated entirely through digital stimuli, questions remain about whether such emotional engagement can yield the same behavioral outcomes as in real-world tourism (Bergs et al., 2020).

Given its documented role in digital engagement, it is reasonable to expect that stronger emotional involvement in Virtual Cultural Heritage Tourism leads to greater continuance intention.

H6: Emotional Involvement positively influences Continuance Intention (ITU) in Virtual Cultural Heritage Tourism.

3.7. Enjoyment and Continuance Intention in Virtual Cultural Heritage Tourism

In VR tourism, enjoyment may arise from features such as gamified elements, immersive storytelling, and aesthetic design (Škola et al., 2020). These characteristics can sustain users' attention, enhance cultural engagement, and increase satisfaction with the platform.

Previous studies in VR gaming and digital media indicate that enjoyment significantly influences platform loyalty, longer interaction time, and continued usage (Gardner et al., 2017). Although VR tourism differs from entertainment-based applications by emphasizing cultural exploration, enjoyment still contributes to how users evaluate the experience's quality and personal relevance.

In the context of Virtual Cultural Heritage Tourism (VCHT), enjoyment may elevate perceived value by making cultural learning more engaging and emotionally resonant. This affective dimension plays an essential role in encouraging repeated engagement. When users find the experience enjoyable, they are more inclined to revisit or recommend the platform, reinforcing continued use (Y. H. Kim et al., 2013).

Therefore, enjoyment is expected to support not only momentary satisfaction but also longer-term behavioral intention in VCHT settings.

H7: Enjoyment positively influences Continuance Intention (ITU) in Virtual Cultural Heritage Tourism.

3.8. Mediating Effect

Research shows that telepresence enhances perceived realism and immersion, emotional involvement deepens personal connection, and enjoyment fosters engagement—each contributing to more memorable experiences (Csikszentmihalyi, 1990; Heinonen & Murto, 2023; Hoffman & Novak, 2009). Memorable Tourism Experience (MTE), in turn, has been linked to post-visit behaviors such as continued use and loyalty (Hamari et al., 2016; Leung et al., 2022).

While MTE's impact is well established in physical tourism, its role as a mediator in virtual contexts remains underexplored. Testing this mediation helps clarify whether MTE explains the mechanism through which telepresence, emotional involvement, and enjoyment influence continuance intention (ITU) in Virtual Cultural Heritage Tourism (VCHT).

Understanding this mediating process is important to evaluate whether virtual experiences can create lasting behavioral outcomes similar to real-world visits. Thus, we propose:

H8: Memorable Tourism Experience (MTE) mediates the relationship between Telepresence and Continuance Intention (ITU) in Virtual Cultural Heritage Tourism.

H9: Memorable Tourism Experience (MTE) mediates the relationship between Emotional Involvement and Continuance Intention (ITU) in Virtual Cultural Heritage Tourism. H10: Memorable Tourism Experience (MTE) mediates the relationship between Enjoyment and Continuance Intention (ITU) in Virtual Cultural Heritage Tourism.

4. METHODOLOGY

This study employed a quantitative research approach to explore the factors influencing Gen Z's continuance intention in virtual cultural heritage tourism. The study focused on virtual tours of the Borobudur Temple, a UNESCO World Heritage Site in Indonesia, using platforms such as 360 Indonesia, Indonesia Virtual Tour, and 360 Cities. Data collection was conducted over a one-month period in 2024 using a cross-sectional survey. To ensure response validity regarding the specific virtual destination, the study followed a task-based procedure. First, respondents were presented with the survey guidelines and a mandatory stimulus: a link to a 360-degree virtual tour of Borobudur Temple via mobile VR apps. Respondents were instructed to explore the virtual site thoroughly to ensure a sufficient level of immersion and interaction with the content. Immediately after completing this virtual exploration, respondents proceeded to the questionnaire section to evaluate their specific, real-time experience.

The target population was Generation Z in Indonesia. A non-probability purposive sampling technique was employed. To ensure the sample had a genuine interest in the topic, the survey link was disseminated through digital tourism-interest communities on Instagram and WhatsApp. Furthermore, to strictly filter the demographic, a mandatory screening question regarding the birth year was placed at the beginning of the survey. Only respondents born between 1997 and 2012 were permitted to proceed.

The study obtained a final valid sample of 425 Gen Z participants. As shown in Table 1, the sample comprised 188 males (44.2%) and 237 females (55.8%). Among them, 265 participants (62.4%) had prior experience with VR technology, while 160 (37.6%) had not. In addition, 206 respondents (48.5%) had experienced virtual tourism before, whereas 219 (51.5%) were new to this type of tourism. These respondents represent a diverse group of novice and experienced VR users, offering a balanced perspective on the VR tourism context.

Table 1. Demographic Information

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	188	44.2%
	Female	237	55.8%
VR Experience	Experienced	265	62.4%
	Not Experienced	160	37.6%
Virtual Tourism Experience	Experienced	206	48.5%
	Not Experienced	219	51.5%
Total Respondents		425	100%

The constructs were measured using items modified from prior studies to fit the VR tourism context. The questionnaire consisted of 22 items (see Appendix A). Each item was rated on a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree). The neutral option was deliberately omitted to avoid central tendency bias and encourage respondents to make definitive decisions regarding their perceptions (Garland, 1991). Emotional involvement, enjoyment, telepresence, memorable tourism experiences, and continuance intention were measured using validated scales adapted from Atzeni et al (2022), Yim & Park (2019), Morrison (2022), and Koroma et al (2022).

Data analysis was performed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via Smart-PLS 4. PLS-SEM is a robust method widely used in marketing and management information systems, offering reliable estimates for complex causal models (Hair et al., 2011). It is well-suited for theoretical framework validation and empirical data contexts, particularly in exploratory research. Additionally, descriptive statistics and respondent characteristics were calculated using SPSS software to complement the PLS-SEM analysis. The measurement model was assessed for reliability and validity through Cronbach's alpha, composite reliability, AVE, Fornell-Larcker criterion, and HTMT ratios. The structural model was tested for direct, indirect, and moderating effects, using path coefficients, t-statistics, and p-values.

5. RESULTS

The results of the structural equation modeling confirmed that the measurement model was reliable and valid. Factor loadings for all indicators were above the recommended threshold of 0.70, indicating strong indicator reliability.

Table 2. Loading Factor and Realiability Test Table

Variable	Item	Factor Loading	AVE	Cronbach's Alpha
EMI	EMI1	0.764	0.680	0.843
	EMI2	0.862		
	EMI3	0.839		
	EMI4	0.831		
ENJ	ENJ1	0.852	0.782	0.907
	ENJ2	0.903		
	ENJ3	0.890		
	ENJ4	0.892		
ITU	ITU1	0.900	0.811	0.883
	ITU2	0.918		
	ITU3	0.884		
MTE	MTE1	0.786	0.613	0.909
	MTE2	0.823		
	MTE3	0.756		
	MTE4	0.836		
	MTE5	0.720		
	MTE6	0.840		
	MTE7	0.769		
	MTE8	0.726		
TL	TL1	0.857	0.740	0.824
	TL2	0.891		
	TL3	0.832		

For instance, AU4 loaded at 0.814, EMI2 at 0.862, and ENJ2 at 0.903. Internal consistency was supported by Cronbach's alpha (α) and composite reliability (CR). Authenticity recorded the lowest α value of 0.799, while enjoyment achieved the highest at 0.907. Similarly, composite reliability ranged from 0.869 for authenticity to 0.935 for enjoyment, indicating all constructs were reliable. Convergent validity was established as all AVE values exceeded 0.50. The AVE for memorable tourism experiences was 0.613, the lowest among the constructs, while continuance intention had the highest AVE at 0.811, showing strong explanatory power for its indicators.

Discriminant validity was assessed using the HTMT ratios. HTMT ratios provided additional confirmation, with all values below 0.90.

Table 3. HTMT Table

	AU	EMI	ENJ	ITU	MTE	TL
AU						
EMI	0,790					
ENJ	0,764	0,837				
ITU	0,653	0,757	0,706			
MTE	0,729	0,809	0,732	0,765		
TL	0,766	0,663	0,623	0,627	0,574	

For example, the HTMT ratio for emotional involvement and enjoyment was 0.837, while for emotional involvement and memorable tourism experiences, it was 0.809. These results indicated that the constructs were distinct and measured unique aspects of the research model.

The structural model revealed significant direct relationships between key variables. Emotional involvement significantly predicted continuance intention ($\beta = 0.185$, $p = 0.003$) and memorable tourism experiences ($\beta = 0.440$, $p < 0.001$). Enjoyment was also a strong predictor, influencing both continuance intention ($\beta = 0.179$, $p = 0.002$) and memorable tourism experiences ($\beta = 0.290$, $p < 0.001$). Telepresence positively influenced continuance intention ($\beta = 0.159$, $p = 0.001$) and memorable tourism experiences ($\beta = 0.103$, $p = 0.022$). Memorable tourism experiences had the strongest direct effect on continuance intention ($\beta = 0.376$, $p < 0.001$). However, authenticity did not significantly predict continuance intention ($\beta = -0.004$, $p = 0.948$).

Table 4. Hypotheses Test Table

	Original sample (O)	T statistics (|O/STDEV|)	P values	R Square
EMI -> ITU	0,185	3,007	0,003	0,566
ENJ -> ITU	0,179	3,092	0,002	
TL -> ITU	0,159	3,187	0,001	
MTE -> ITU	0,376	5,774	0,000	
EMI -> MTE	0,440	8,265	0,000	0,559
ENJ -> MTE	0,290	5,218	0,000	
TL -> MTE	0,103	2,293	0,022	

The model demonstrated strong explanatory power. The R^2 value for memorable tourism experiences was 0.559, meaning that emotional involvement, enjoyment, and telepresence explained 55.9% of its variance. For continuance intention, the R^2 was 0.566, indicating that memorable tourism experiences, emotional involvement, enjoyment, and telepresence collectively explained 56.6% of its variance

Mediation Test Table

Table 5. Table 5. Mediation Test Table

	Original sample (O)	T statistics (|O/STDEV|)	P values
EMI -> MTE -> ITU	0,166	4,483	0,000
ENJ -> MTE -> ITU	0,109	3,974	0,000
TL -> MTE -> ITU	0,039	2,010	0,044

The model also revealed significant indirect effects. Emotional involvement influenced continuance intention indirectly through memorable tourism experiences ($\beta = 0.166$, $p < 0.001$). Enjoyment had a similar indirect effect ($\beta = 0.109$, $p < 0.001$). Telepresence also influenced continuance intention indirectly through memorable tourism experiences ($\beta = 0.039$, $p = 0.044$). The interaction effect of authenticity and memorable tourism experiences on continuance intention was not significant ($\beta = 0.048$, $p = 0.289$). This result indicates that authenticity does not moderate the relationship between memorable tourism experiences and continuance intention for Gen Z users in virtual cultural heritage tourism. These findings highlight the strength of the proposed model in understanding the behavioral tendencies of Gen Z users in virtual cultural heritage tourism.

6. DISCUSSION

The findings confirm Hypotheses 1, 2, and 3, showing that telepresence, emotional involvement, and enjoyment significantly shape Memorable Tourism Experiences (MTE) in Virtual Cultural Heritage Tourism (VCHT). Among these, enjoyment emerged as the strongest predictor, followed by emotional involvement and telepresence. Telepresence played a crucial role in enhancing users' sense of "being there," making the virtual environment feel real and immersive. This aligns with the principles of Flow Theory (Csikszentmihalyi, 1990) and supports previous studies (Hoffman & Novak, 1996; Shin, 2018), which highlight the importance of immersion in fostering deep engagement in digital environments. However, while telepresence was significant, its effect was weaker than emotional involvement and enjoyment, indicating that technological immersion alone is insufficient to create a lasting impact. These findings suggest that while telepresence initially draws users into the virtual space, it is emotional engagement and intrinsic enjoyment that solidify their connection to the experience, making it more memorable. Emotional involvement further strengthened MTE by fostering personal connections to the cultural content, consistent with D. Kim & Ko (2019), who emphasized the role of emotional bonds in enhancing cognitive recall and deepening user engagement.

The stronger influence of enjoyment over telepresence in this study extends Flow Theory by demonstrating that in VCHT, flow states are primarily driven by hedonic and emotional engagement rather than technological immersion alone. Prior research in gaming and e-learning (Petersen et al., 2022; Tussyadiah et al., 2017) emphasized that immersion plays a dominant role in facilitating flow, but these findings suggest that in VR tourism, the enjoyment derived from interaction, narrative engagement, and self-paced exploration plays a more decisive role in forming MTE. This challenges traditional applications of Flow Theory, indicating that VCHT should not only focus on creating realistic, immersive environments but also ensure that the experience is engaging, emotionally stimulating, and enjoyable.

The analysis of Hypothesis 4 further supports the role of MTE in predicting Continuance Intention (ITU). Users who found the virtual tourism experience memorable were significantly more likely to return or recommend it to others. This finding aligns with existing literature, where memorable experiences in physical tourism have been shown to foster repeat visits and long-term loyalty (X. Chen et al., 2020; J. H. Kim, 2018). However, in the context of VCHT, where physical presence is absent, the emotional and cognitive impact of the experience becomes even more crucial in sustaining engagement. This result suggests that VR developers should shift their focus beyond surface-level immersion and prioritize elements that evoke emotional and cognitive resonance. Features such as interactive storytelling, personalized exploration, and emotionally compelling cultural narratives can enhance the likelihood that users perceive the experience as meaningful and memorable, increasing their intention to revisit and continue engaging with VCHT platforms.

The findings from Hypotheses 5, 6, and 7 reveal that telepresence, emotional involvement, and enjoyment each directly influence ITU, with enjoyment once again emerging as the strongest predictor. This finding is consistent with Flow Theory and prior research on VR engagement (Hamari et al., 2016; Shin, 2018), which emphasize that users are more likely to sustain engagement with a platform when they derive pleasure from the experience. Emotional involvement also had a strong effect on ITU, supporting studies by (Levy, 2022; Wang et al., 2016), which found that affective connections strengthen user attachment and long-term loyalty to digital experiences. Interestingly, telepresence had a smaller but still significant impact on ITU, indicating

that while immersion can enhance initial engagement, it is emotional connection and enjoyment that sustain long-term user retention. This suggests that VR tourism developers should balance technological fidelity with emotionally engaging content to encourage repeat usage and deeper exploration.

The mediation analysis for Hypotheses 8, 9, and 10 confirmed that MTE serves as a crucial mediator between experiential factors (telepresence, emotional involvement, enjoyment) and continuance intention. Although all three predictors directly influenced ITU, their effects were substantially amplified when mediated through MTE. This finding extends previous research on MTE in physical tourism (Leung et al., 2022), demonstrating that in VCHT, the memorability of an experience is central to sustaining long-term engagement. The mediation effect was particularly strong for telepresence, reinforcing the idea that immersion alone is not enough—what matters is whether the experience leaves a lasting impression (X. Chen et al., 2020). Emotional involvement and enjoyment also exhibited strong mediation effects, supporting studies suggesting that users who develop emotional connections and derive pleasure from digital tourism experiences are more likely to revisit and continue engaging with such platforms (Heinonen & Murto, 2023; Xiang et al., 2022). These results underscore the importance of designing VR tourism experiences that do more than just simulate physical visits—they must evoke emotion, engagement, and personal resonance.

7. CONCLUSIONS

This study examined how telepresence, emotional involvement, and enjoyment shape Memorable Tourism Experiences (MTE) and influence Continuance Intention (ITU) within Virtual Cultural Heritage Tourism (VCHT) among Generation Z. The findings confirm that all three factors significantly contribute to MTE, with enjoyment emerging as the strongest predictor, followed by emotional involvement and telepresence. These findings suggest that Gen Z does not simply seek immersion in virtual tourism—rather, they engage with VCHT as a dynamic, interactive, and entertainment-driven experience. While telepresence helps establish a sense of presence, it is the emotional and hedonic value of the experience that sustains long-term engagement.

This study extends Flow Theory by demonstrating that in VCHT, hedonic and emotional engagement outweigh telepresence in fostering immersive experiences. Traditional Flow Theory applications in gaming and e-learning emphasize immersion as the dominant factor in achieving flow states (Hamari et al., 2016; Hoffman & Novak, 1996). However, this study highlights that for Gen Z users in VCHT, interactivity, emotional engagement, and enjoyment play a more critical role than immersion alone. This suggests a shift in how flow is experienced in digital tourism environments, requiring a reconceptualization of Flow Theory when applied to VR-based tourism.

Furthermore, this study refines Uses and Gratifications Theory (UGT) by demonstrating that beyond initial media selection, gratifications evolve into sustained behavioral patterns through MTE. While UGT traditionally explains media use motivation based on entertainment, social interaction, and informational needs (Katz et al., 1974; Ruggiero et al., 2021), this study provides empirical evidence that hedonic gratifications do not just drive initial adoption but also play a pivotal role in shaping memorable experiences that encourage long-term engagement. The integration of MTE as a mediating factor in UGT applications represents a theoretical advancement, highlighting how user engagement in digital tourism is not merely

driven by motivations at the time of media selection but is reinforced by the emotional and experiential depth of the engagement itself.

These findings offer practical insights for VR developers, tourism marketers, and cultural institutions. For VR developers, the results indicate that focusing on graphical realism and immersion alone is insufficient to maintain engagement. Instead, emphasizing gamification, interactive storytelling, and emotionally resonant narratives can significantly enhance user retention. VR-based heritage experiences should integrate self-paced exploration, cultural narratives, and social interaction features to maximize their effectiveness in engaging Gen Z users. For tourism marketers, the results suggest that marketing strategies should highlight the entertainment and engagement aspects of VCHT rather than focusing solely on historical accuracy or technological sophistication. Leveraging social media engagement, influencer collaborations, and user-generated content can help position VCHT as both an educational and entertaining digital tourism alternative. For cultural institutions, the study underscores that VCHT should not only serve as an educational tool but also as an immersive, interactive medium that aligns with Gen Z's digital behaviors. Collaborations between cultural heritage organizations and VR developers should prioritize creating interactive, emotionally engaging heritage experiences that balance historical accuracy with digital storytelling..

7.1. Limitation

Despite its contributions, this study has several limitations. First, the study focuses exclusively on Generation Z, meaning the findings may not fully generalize to Millennials or older demographics, who may engage with VCHT differently. Second, the study is limited to the Virtual Cultural Heritage Tourism context, which may not extend to other forms of virtual tourism (e.g., nature-based VR, adventure VR). Third, regarding the respondents' prior experience with VR, this study treated it as a dichotomous variable (Experienced vs. Not Experienced) without capturing specific details on the hardware used (e.g., high-end Head-Mounted Displays vs. mobile viewers). Since the quality of past device exposure might influence current expectations, this remains a limitation. Fourth, regarding the measurement instrument, the study utilized a 4-point Likert scale to minimize central tendency bias; however, this choice may limit the nuance of responses compared to wider scales (e.g., 7-point). Fifth, the research relies on self-reported measures, which may introduce response biases. Lastly, this study is cross-sectional, capturing only a snapshot of user engagement, whereas user relationships with VCHT may evolve over time.

7.2. Future Research

To build upon these findings, future research should explore cross-generational engagement with VCHT, examining whether Millennials and older audiences exhibit different engagement patterns compared to Gen Z. Future studies are also recommended to categorize respondents based on the technical level of their previous VR usage to examine potential moderating effects. Additionally, longitudinal studies could investigate how MTE influences long-term attitudes and behaviors toward cultural heritage tourism, particularly in terms of physical visitation patterns following virtual exposure. Another promising avenue is assessing the impact of social interaction in VR tourism, including multiplayer virtual tourism, digital heritage communities, or AI-guided interactions, to determine how social presence enhances emotional involvement and engagement. Furthermore, future research could examine the role of AI-driven personalization in VR heritage tourism, evaluating how adaptive content recommendations enhance user

satisfaction and engagement. Finally, investigating how VR tourism contributes to cultural preservation and heritage accessibility for underrepresented communities would provide valuable insights into the broader societal impact of virtual tourism technologies.

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APPENDIX A.

Table 6.

Construct	Measurement Items
Emotional Involvement (EMI)	During the virtual tour, I tried to look around or explore the virtual world.
	I was impressed by the virtual tour activity.
	I felt that I really tried out various things during the virtual tour activity.
	I truly felt a "WOW" sensation while participating in the virtual tour.
Enjoyment (ENJ)	The virtual tour activity was very enjoyable.
	I was satisfied with the virtual tour activity.
	I felt happy with the virtual tour activity.
	I had fun with the virtual tour activity.
Telepresence (TL)	When exploring the virtual environment, I felt as if I were actually at the tourism destination.
	I felt like I was present inside the displayed environment.
	I felt the authenticity of the characters and objects within the virtual environment.
Memorable Tourism Experiences (MTE)	I enjoyed visiting through the virtual tour.
	Virtual tourism was a unique experience for me.
	Visiting Borobudur virtually gave me a picture of the tourist atmosphere around Borobudur.
	It was a new experience for me when exploring the virtual tourism environment.
	I felt free when I could walk around inside the virtual tourism environment.
	Knowing and experiencing virtual tourism was something valuable to me.
	In the virtual environment, I tried features such as reading information and navigating from one place to another.
	I gained new information/knowledge after completing the virtual tourism visit.
Intention to Continue to Use (ITU)	I intend to do virtual tourism again.
	I will do virtual tourism again someday.
	It is very likely that I will engage in virtual tourism in the future.

Notes

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