Eksplorium *p*-ISSN 0854-1418
Volume 46 No. 2, June 2025: 497–522 *e*-ISSN 2503-426X

Exploring the Impact of Virtual Destination Element on Tourist Behavior in Metaverse Tourism: A Flow Theory Perspective

[1] Chen Dezhi, [2]Ayesha Zaheer Abbasi, [3]Wasim Ahmad
UCSI Graduate Business School, UCSI University, Malaysia.
Email: 1002266857@ucsiuniversity.edu.my
Corresponding author**
School of Education, Guangzhou University.
ayeshazaheerabbasi35@gmail.com
Corresponding author*
UCSI Graduate Business School, UCSI University, Malaysia.
Email: wasimtouseef@hotmail.com
Article Received: 13 May 2025, Revised: 17 June 2025, Accepted: 23 June 2025

Abstract: Based on the stimulus-organism-response (SOR) framework and flow theory, this study investigates the effects of the characteristics of the metaverse (interactivity, storytelling, gamification, soundscape, authenticity of virtual destinations) - flow, memory, nostalgia, and attachment to destination - tourists' actual visit intention. A total of 502 samples from different regions of China were collected through a questionnaire survey, and the data were analyzed using the smart partial least squares method (SmartPLS). The results show interactivity, storytelling, gamification, soundscape and authenticity of the virtual destination jointly positively affect flow, and then flow has an enhancing effect on memory and attachment to destination. Then memory positively affects nostalgia and actual visit intention, nostalgia can also positively affect actual visit intention, Finally, attachment to destination has a positive impact on actual visit intention. This study provides a theoretical basis for metaverse tourism and provides practical guidance for destination marketers.

Key words: Metaverse Tourism, SOR, Flow theory, Virtual Destination Characteristics, Actual Visit Intention

1. Introduction

The Metaverse, which was first referred to in Neal Stephenson's Snow Crash (Bourlakis et al., 2009), is currently an area of study. It's being applied to tourism to manage post-COVID-19 challenges more and more (Buhalis & Karatay, 2022; Mahmoud et al., 2024). Virtual tours and gamification activities utilizing AR and VR in the Metaverse increase sustainable tourism while offering immersive pre-visit experiences in addition to traditional practices (Go & Kang, 2023; Natarajan et al., 2024).

There are literature gaps in understanding how virtual destination attributes affect interactivity, storytelling, and authenticity in tourist decisions (Chakraborty et al., 2024). The degree to which these environments stimulate emotional experience and memory for destination attachment is not clear. Although the Stimulus-Organism-Response (S-O-R) model is appropriate for offline tourism, it is only beginning to be modified for digital and metaverse environments. This study seeks to integrate S-O-R with Flow Theory in order to develop an integrated framework for metaverse tourism user experiences. The metaverse's transformative power is premised on

immersive flow experiences. Flow, an optimal state of involvement and enjoyment, is essential for maximizing virtual experiences (Csikszentmihalyi, 1975). High interactivity, immersive storytelling, gamification, and realistic cultural portrayals have the potential to stimulate intense emotional responses and increase immersion. These elements increase user participation and create nostalgia, emotional connections, and attachment to destinations, resulting in actual visit intentions (Zhu et al., 2023; Kılıçarslan et al., 2024). This study highlights the necessity of understanding how the emotional and sensory dimensions of virtual environments create memory and nostalgia. Key features for successful virtual experiences connect physical and virtual tourism. Augmented storytelling with soundscapes and gamification create memorable experiences, strengthening emotional connections between tourists and destinations (Privitera et al., 2023; Lu et al., 2022). The authenticity of a destination establishes trust and emotional connections in virtual spaces (Nguyen, 2020; Moore et al., 2021). The latest studies identify immersion as central to intense emotional engagement. Tsai (2022) identifies holistic presence—sensation of space, social connection, and self-awareness—increasing travel intentions in metaverse tourism. These components enhance emotional connections to virtual destinations, making trip expectations more realistic. According to Koo et al. (2022), such expectations have a positive impact on travel intentions. Kim and Hall (2019) identify pleasure and involvement as essential for tourists' engagement in the metaverse and encouraging happiness and receptiveness to technology. Buhalis et al. (2023) also convey this indicates a significant paradigm shift in tourism marketing and branding. Virtual experiences improve brand awareness and generate visits to real destinations.

Many experts believe that the metaverse is something added to regular tourism, not meant to replace it. It encourages people to travel physically, not replace it. These statements show how the metaverse can help bring together virtual experiences and real tourism. The present study will explore the interrelated components of metaverse tourism. It aims to contribute to understanding how this sector can integrate virtual experiences with actual travel. This paper will attempt to help professionals create virtual experiences that are culturally rich and engaging. The aim is to encourage emotional connections that lead to real-life visits and to make these experiences accessible to people around the world.

2.Literature Review and Hypotheses

2.1 SOR Model

The S-O-R model proposed by Mehrabian and Russell in 1974 describes the influence of environmental stimuli on behavior via organic states. Initially, it was concerned with emotional responses, but it now incorporates cognitive responses as mediators (Chan et al., 2017). The S-O-R model plays a significant role in explaining user experience and behavioral intentions regarding tourism and virtual reality.

Kim et al. (2020) utilised the S-O-R model to investigate VR tourism's impact on revisit intention through emotional engagement. Huang and Bu (2022) employed the model to measure how destination factors impact tourist intentions in virtual rural tourism, with positive arousal and memory as mediators. Ying et al. (2021) tested how virtual reality advertising has an effect on revisit intention, mediated by remote presentations and attitudes.

The model has also been modified to research more specific behaviors such as gift-giving in a virtual setting. For instance, Li and Peng (2021) investigated how the features of live streaming lead to virtual gift-giving

behavior by users, under the influence of emotional attachment and immersive flow experiences. More recent research demonstrates that the extended Stimulus-Organism-Response (S-O-R) framework offers a more comprehensive theoretical foundation for investigating user behavior in immersive virtual and tourism contexts, therefore underlining the interaction between emotional and cognitive organic states (Chen et al., 2020; Kim et al., 2020).

2.2 Flow Theory

Flow theory, which was first formulated by Csikszentmihalyi in 1975, refers to a condition of complete absorption in activities, characterized by concentrated attention and distorted time perception (An et al., 2021). Flow theory has been applied in art, education, sports, heritage communication, virtual shopping, and cultural campaigns (Cao et al., 2024; Jafar et al., 2024). Perceived immersion through interactivity in these cases is found to enhance flow states in VR, enhancing user satisfaction and intentions (Cao et al., 2024; Jafar et al., 2024). Flow theory is now extended to the metaverse. Kim and Hall (2019) connected hedonic motivations—flow and enjoyment—in virtual reality tourism with tech use and happiness. Jafar et al. (2024) examined telepresence and flow's influence on consumer behavior with a focus on interactivity and vividness. Wang et al. (2024) discovered that interactive VR has strong effects on flow experiences and usage intentions. Flow states influence consumer behavior in the metaverse. Kim et al. (2024) discovered copresence enhances flow and well-being through escapism, central to metaverse design. Park et al. (2023) investigated digital fashion consumption on metaverse platforms through flow, motivated by interactivity and purchase intention. DeMatos et al. (2021) emphasized flow experiences' importance in tourism for emotional immersion. These works demonstrate the versatility of flow theory in virtual reality, tourism, and the metaverse. Enjoyable virtual experiences require states of flow.

2.3 Actual Visit Intention

Visit intention, a central variable in tourism behavior and the final dependent variable here, is split into first and repeat visits. First-time intent is driven by destination image and perceived risk, with motivation enhancing image via novelty and safety (Maghrifani et al., 2021), though risks (financial, time, socio-psychological) deter it (Khan et al., 2018), mitigated by motivation (Reisinger & Mavondo, 2005). Media and social recommendations boost image perception and intent (Koo et al., 2016). Repeat visits rely on past experience and familiarity, fostering emotional connection and reducing uncertainty (Tan & Wu, 2016; Prentice, 2004), with interactive motivation from local customs (Maghrifani et al., 2021) and service quality driving satisfaction and loyalty (Huang & Hsu, 2009). First visits prioritize functional attractions, while repeat visits focus on emotional bonds (Maghrifani et al., 2021).

2.4 Virtual Destination Interactivity

Hoffman and Novak (2009) describe interactivity as control of systems by users. McMillan and Hwang (2002) mention it’s a perceptual construct influenced by user experience, emphasizing the role of feelings. Interactivity is essential in virtual tourism. Hudson et al. (2019) observed it increases consumer immersion. Yim et al. (2017) established that augmented reality enhances visual attention, resulting in greater enjoyment and usefulness in

media. This is an indication that interactivity matches well with flow in virtual environments. These two studies by Cowan and Ketron, 2019; Kowalczuk et al., 2021, demonstrate that interactivity can enhance users' cognitive and affective appraisals and may very well be located at the core of important mediation in positive consumer evaluations. The foundation is essential to understanding how user experience forms in virtual destinations. Virtual destinations emphasize user-environment interaction rather than human interaction (Hudson et al., 2019). Users are at liberty to roam around in attractions, interact with virtual objects, and manipulate variables to provide personalization and immersion. Interactive environments may create flow states (Huang & Hsu Liu, 2014). Based on the above literature review and proposed model of the study, It can be hypothesized that

H1: The virtual destinations interactivity positively influences users' flow experience

2.5 Virtual Destination Storytelling

Moin et al. (2020) demonstrated that VR-enhanced digital storytelling boosts tourists' interest and travel intention, offering realistic and emotionally engaging experiences. Yang (2023) extended this with the "cultural metaverse," using AR storytelling to enhance cultural heritage and immersion. van Berlo and Stikos (2023) found AR storytelling increases immersion and brand associations, aiding destination branding, while Ma et al. (2023) showed narrative videos evoke stronger emotional arousal and memory effects than traditional media. Privitera et al. (2023) highlighted audio's role in immersive storytelling for cultural heritage, enhancing user experience. Huang et al. (2010) framed this within VR learning environments, linking immersion, interaction, and imagination to motivation, applicable to tourism. Csikszentmihalyi (1990) defines flow as deep engagement and enjoyment, potentially induced by storytelling's immersive nature, supported by emotional arousal (Ma et al., 2023) and interactivity (Yang, 2023; van Berlo & Stikos, 2023). It can be hypothesized that

H2: virtual destination storytelling positively influences user's flow experience

2.6 Virtual Destination Gamification

Gamification in virtual tourism is an emerging field with significant potential and challenges. Xu et al. (2017) highlight its role with VR and AR in marketing and experience design, while Chen and Lin (2018) demonstrate its facilitation of social and entertainment interactions. Guo et al. (2022) and Kim et al. (2021) confirm gamification enhances flow, fun, and satisfaction, particularly through intrinsic motivators like letterboxing. Huang et al. (2020) note its positive impact on brand attitudes and purchase intention, especially for Millennials and Gen Z (Xu et al., 2016; Skinner et al., 2018). However, Parapanos and Michopoulou (2021) stress balancing competition and collaboration with a meaningful in-game economy, and Leclercq et al. (2020) suggest gamification affects experience via cognitive, emotional, and social pathways, with mechanisms needing further study. Hamari et al. (2016) and Kim et al. (2021) further link gamification to flow, improving learning and immersion in tourism.

Based on the above research findings, one may reasonably speculate that gamification design in virtual destination environments has a positive impact on the tourists' flow experience. Thus, this study develops the following hypothesis:

H3: Virtual destinations gamification has a positive impact on tourists' flow experience.

2.7 Virtual Destination Soundscape

Soundscapes have gained scholarly attention as a key tourism experience element, with Jiang et al. (2017) and Liu et al. (2018) showing natural soundscapes boost satisfaction and loyalty. They also shape destination image and serve as unique attractors (Daugstad, 2008; Watts & Pheasant, 2015). In virtual tourism, enabled by VR, soundscapes enhance immersion and experience quality (Buzova et al., 2021). Qiu et al. (2021) found they influence visual perception and restorative effects in virtual settings, while Lu et al. (2022) and Kankhuni and Ngwira (2021) link soundscapes to flow and memorable experiences, with perceived value positively impacting satisfaction and behavioral intentions.

H4: virtual destination soundscape positively influence user's flow experience

2.8 Virtual Destination Authenticity

The tourism experience has expanded into virtual realms with VR and AR technologies (Buhalis et al., 2023; Dwivedi et al., 2023), making authenticity a key research focus. Authenticity theory posits that tourists seek experiences aligning with expectations and values (Salet, 2021), with Nguyen (2020) identifying objective (replicating physical traits), constructed (reflecting local culture), and existential (self-identity and emotional connection) dimensions. Moore et al. (2021) and Rickly (2022) emphasize its role in virtual tourism, enhancing immersion and flow when perceived as authentic. Liu et al. (2024) and Zhang et al. (2019) confirm a positive link between authenticity and flow, influencing purchase and immersion.

H5: Virtual destination authenticity positively impacts the flow of tourists

2.9 Flow

Flow, defined as an optimal psychological state of total engagement (Csikszentmihalyi, 1975, 1990), is a key measure of tourist experience quality (Adam, 2015; Kim & Thapa, 2018), studied across contexts like cultural parks (Zhang et al., 2019), theme parks (Fu et al., 2017), and water-based activities (Cheng & Lu, 2015; Wu & Liang, 2011), and increasingly in live and VR tourism (Ding & Hung, 2021; Bai et al., 2023). Flow enhances memory (Sreejesh et al., 2018) and destination attachment (Zheng & Fu, 2024) by reducing psychological distance and boosting pleasure (Nah et al., 2011), fostering emotional connections and fun (Willems et al., 2019; Ying et al., 2021). Ding and Hung (2021) and Li and Peng (2021) confirm its positive impact on memory and attachment in music festivals and live broadcasts.

Based on the previous discussion, one might perceive that the experience of flow may enhance tourists' memory in terms of higher arousal by reducing psychological distance. Thus, based on the above review, it is hypothesized as follows:

H6: Flow experience has a positive impact on their memory.

H7: Flow experience has a positive impact on their destination attachment.

2.10 Memory

Memory is a critical concept in tourism, with Kim et al. (2012) noting that impactful experiences shape unforgettable memories influencing emotions and behaviors (Yin et al., 2017). Kim and Chen (2019) highlight

how autobiographical travel memories rekindle positive moods, guide destination choices, and encourage sharing. Kim et al. (2021) developed a scale (accessibility, vividness, details, sensory input, valence, intensity, sharing) showing memory valence drives visits and information sharing, with Huang and Bu (2022) confirming positive memories boost revisit intent and word-of-mouth. Kim and Jang (2016), Barnes et al. (2016), and Agapito et al. (2017) link memory retrieval, vivid sensory experiences, and longitudinal effects to emotional responses, behavioral intentions, and loyalty. Zhang et al. (2020) and Kim et al. (2022) further connect travel memories to nostalgia, enhancing revisit intentions and communication via emotional mediation. Based on the above literature, the following hypotheses can be proposed:

H8: Memory positively influences nostalgia.

H9: Memory positively influences actual visit intention.

2.11 Nostalgia

Originally, nostalgia was regarded as a kind of homesickness or mental illness (McCann, 1941). However, as deepening the research, scholars found that nostalgia is actually a complex positive emotional experience (Sedikides & Wildschut, 2016). When people recall good experiences in the past, they will have positive emotions such as warmth, happiness, and gratitude (Holbrook & Schindler, 1994). In the tourism context, nostalgia can come from the recollection of past travel experiences (Hu & Xu, 2021), or it can come from the yearning for the history and culture of a destination (Chi & Chi, 2020). Studies have shown that nostalgia can enhance the emotional connection between tourists and destinations (Tsai et al., 2020), enhance tourists' attachment to the destination (Cho, 2021), and promote tourists' identification with the destination (Lu et al., 2022). When tourists feel nostalgic for a destination, they often want to relive this emotional experience by revisiting the destination (Barnes et al., 2016). Furthermore, nostalgia is also claimed to enhance tourists' happiness and meaningfulness of life (Sedikides et al., 2015). Such a positive mental state may contribute more to tourists' revisit intention. Therefore, this study has the following hypothesis:

H10: Nostalgia has a significant positive impact on actual visit intention.

2.12 Attachment to Destination

Place attachment, introduced by Tuan (1977), reflects emotional, cognitive, and behavioral bonds with settings (Hidalgo & Hernandez, 2001; Ramkissoon et al., 2013), in tourism signifying a positive connection from interactions, cultural experiences, and destination traits (Kyle et al., 2005). It evolves with new experiences, such as local festivals or resident interactions, deepening attachment (Halpenny, 2006), and aligns with personal preferences and identity (Moore & Graefe, 1994). Studies show it drives behavioral intentions, including revisit and recommendation intent (Cifci et al., 2023; Peng et al., 2022; Yuksel et al., 2010), and encourages environmental support (Lewicka, 2011; Scannell & Gifford, 2010).

H11: Attachment to destination has a positive impact on actual visit intention.

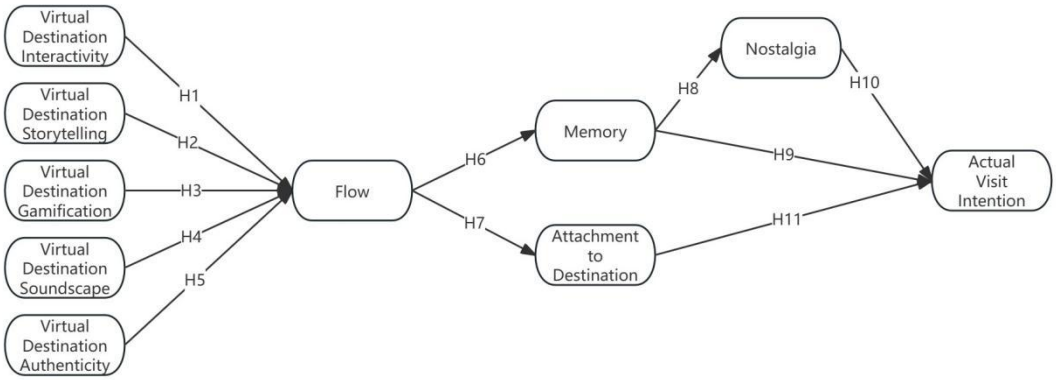

Fig. 1. Structural model of study

3. Research methodology

3.1 Participants and sampling design

The study aimed at the population that had prior experience with the Metaverse, specifically targeting gamers and virtual reality application users. The data collection process utilized snowball sampling Goodman, 1961, a method that allowed the researcher to pick the respondents from within the field. Upon removing the questionnaires that had incomplete answers, there were 502 valid responses. The questionnaire had two parts: demographic information (see Table 1) and experience of respondents in Metaverse. Demographics in Table 1 were evenly distributed, with 48.41% male and 51.59% female respondents. Most of the respondents at 39.84% were aged 18-30 years, followed by 32.78% aged 31-40 years. The lowest, with 15.54%, were aged 50 and above. The sample also demonstrated equal levels of education: secondary school graduates (25.10%), high school graduates (25.70%), and undergraduate degree holders (25.70%), with 23.51% holding a master's degree. They are mostly office workers (51.00%), followed by entrepreneurs (39.04%), then students (9.96%). Monthly income varies; the top bracket gets RMB 9,001-12,000 at 22.31%, followed by above RMB 12,000 at 21.71%. Invalid questionnaires were excluded to ascertain validity of data, which means all the remaining respondents (100%) had experience in Metaverse activities.

Table 1

Sample profile

Items	Categories	Frequency	Percentage
Gender	Male	243	48.41
	Female	259	51.59
Age	18-30 years	200	39.84
	31-40 years	165	32.78
	41-50 years	59	11.75
	Over 50 years	78	15.54
Level of Education	Middle school education	126	25.1
	High school education		
	Bachelor’s education	129	25.7

	Master's education	129	25.7
		118	23.51
Occupation	Student	50	9.96
	Office worker	256	51
	Entrepreneur	196	39.04
	others	0	N/A
Monthly income(RMB)	0-3000RMB	93	18.53
	3001RMB-6000RMB	88	17.53
	600RMB1-9000RMB	100	19.92
	9001RMB-12000RMB	112	22.31
	Above 12000RMB	109	21.71
Did you have any experience related to metaverse	Yes	502	100
	No	0	N/A

3.2 Measures

The second part of the questionnaire included all the structures, drawing on the validated scales in previous studies, including four questions measuring interactivity (Arghashi & Yuksel, 2022), four questions measuring storytelling (Zhang & Wang, 2023), four questions measuring gamification (Luo, 2023), four questions measuring soundscape (Jiang & Yan, 2022) and three questions measuring authenticity (Li et al., 2024). Measured flow through four items derived from Li et al. (2024),。 Assessed using three items adapted from Huang & Bu (2022) and focused on participants' memory. Measured using four items adapted from Hu & Xu (2021) and assessed nostalgia. Assessed using four items adapted from Yoon & Nam (2024) and focused on emotional and functional attachment to the metaverse destination. Measured this using six questions taken from Hu & Xu (2021) and Zhu et al. (2023).Responses were rated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).The questionnaire was written in English and then back-translated into Chinese to ensure semantic accuracy. A pre-test was conducted with 30 metaverse users, and feedback was incorporated to refine the clarity and structure of the questions.

3.3 Data analysis

This research used partial least squares structural equation modeling (PLS-SEM) for two reasons: it effectively evaluates complex models with numerous constructs and is suitable for small to medium sample sizes. PLS-SEM is most appropriate for new fields like metaverse tourism since it doesn't possess strict data distribution assumptions (Cheah et al., 2023; Hair et al., 2013). We assessed the measurement model's reliability and validity through factor loadings, composite reliability (CR), and average variance extracted (AVE). The items with factor loadings less than 0.70 are removed as they are below the cut-off threshold for construct reliability and validity to ensure constructs reflect the theoretical dimensions (Teck Weng Jee et al., 2024). Structural model analysis examined the hypothesized relationships among virtual destination attributes, flow states, and visit intentions.

Path coefficients, R-squared, and effect sizes are indicative of the strength and significance of construct relationships. PLS-SEM was favored because of its ability to handle non-normally distributed data and test mediating effects, necessary to comprehend the impact of virtual experiences on behavior. This research suited the study's purpose in investigating cause-and-effect relationships of virtual immersive environments on real tourist intentions (Jafar & Ahmad, 2024).

4.Result

Table 2

Reliability and validity analysis

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Actual visit intention	0.878	0.878	0.908	0.622
Attachment	0.846	0.851	0.896	0.683
Authenticity	0.819	0.820	0.892	0.734
Flow	0.754	0.747	0.844	0.578
Gamification	0.850	0.851	0.899	0.690
Interactivity	0.861	0.866	0.905	0.705
Memory	0.817	0.831	0.890	0.731
Nostalgia	0.838	0.845	0.891	0.671
Soundscape	0.837	0.846	0.891	0.671
Storytelling	0.841	0.841	0.894	0.678

Reliability and validity of the constructs were tested through Cronbach's alpha, composite reliability, and average variance extracted (AVE). The results are summarised in Table 2.

Reliability Analysis

Cronbach's alpha: The analysis showed that all constructs were internally consistent, with coefficient values ranging from 0.754 for flow to 0.878 for actual visit intention.All coefficients were above the commonly agreed threshold of 0.7, thereby confirming that items in each construct were consistent and reliable (Hair et al., 2019). Composite Reliability: Composite reliability coefficients for all constructs are above the threshold recommended to be 0.7, hence showing constructs were highly reliable with respect to providing a more stable estimate of construct reliability according to Henseler and co-workers (2009).Convergent Validity

The Average Variance Extracted (AVE) values for each construct exceeded the pre-selected threshold of 0.5, ranging from 0.578 for the flow construct to 0.734 for authenticity. These values indicate that the latent constructs account for more than 50% of the variance of the indicators belonging to each construct and so, the convergent validity is satisfactory (Fornell & Larcker, 1981).

Interpretation

These findings support the fact that this measurement model exhibits both reliability and convergent validity. Such a finding thus provides a very firm foundation for further assessment of the structural model. The implication

of this will mean the constructs being used in the research correspond to the theoretical dimensions which they are supposed to evoke, hence proving usefulness in assessing metacosmic tourism behavior.

Table 3

Fornell-Larcker criterion

	AVI	ATD	AUT	F	GAM	INT	M	NOS	SS	ST
AVI	0.789									
ATD	0.394	0.827								
AUT	0.389	0.410	0.857							
F	0.447	0.467	0.512	0.760						
GAM	0.348	0.315	0.327	0.399	0.831					
INT	0.363	0.365	0.368	0.413	0.402	0.840				
M	0.365	0.304	0.361	0.367	0.397	0.399	0.855			
NOS	0.381	0.368	0.345	0.398	0.359	0.434	0.399	0.819		
SS	0.365	0.356	0.326	0.363	0.300	0.372	0.335	0.332	0.819	
ST	0.328	0.284	0.287	0.368	0.338	0.391	0.322	0.385	0.316	0.823

Note 1: AVI=actual visit intention; ATT=attachment to destination; AUT=authenticity; F=flow; GAM=gamification; INT=interactivity; M=memory; NOS=nostalgia; SS=soundscape; ST=storytelling.

The Fornell-Larcker criterion is employed to assess discriminant validity in structural equation modeling. Diagonal values in the table are the square root of the Average Variance Extracted (AVE) for each latent variable, and off-diagonal values are correlations among constructs. Discriminant validity was also confirmed using the Fornell-Larcker criterion, i.e., that for each construct, the square root of the AVE must be higher than its correlation coefficients with the other constructs (Chin, 1998; Hair et al., 2012). The values of the diagonal indicate that all constructs—actual visit intention (0.789), attachment (0.827), and flow (0.760)—have AVE square roots higher than correlations with other constructs. This indicates more variance for the indicators of each construct, establishing discriminant validity. Visit intention has a moderate relationship with flow (0.447) and attachment (0.394), signifying how powerful they are as predictors. However, its relationships with interactivity (0.363) and nostalgia (0.381) are weaker, demonstrating less power. Flow is strongly related to gamification (0.831) and interactivity (0.840), indicating the significance of these factors in optimizing the immersive experience and producing flow states. Nostalgia and memory are correlated at 0.399, indicating nostalgia helps in recollection of memory, but weakly. Nostalgia also correlates moderately with intention to visit (0.381), highlighting its affective influence on decision. Storytelling and soundscape have weaker correlations with the other measures (e.g., storytelling and flow: 0.368, soundscape and flow: 0.363). This suggests they are not significant drivers of flow or visit intention like gamification and interactivity.

Table 3 shows that all constructs meet the Fornell-Larcker criterion for discriminant validity. It shows the strong influence of flow, gamification, and interactivity on visit intentions, followed by nostalgia and memory, as

moderate predictors. These findings confirm the validity of the model and offer implications for future studies aimed at enhancing immersive tourism experiences.

Table 4

P value

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
attachment -> actual visit intention	0.256	0.257	0.047	5.491	0.000
authenticity -> flow	0.337	0.334	0.040	8.400	0.000
flow -> attachment	0.467	0.468	0.035	13.305	0.000
flow -> memory	0.367	0.370	0.035	10.370	0.000
gamification -> flow	0.157	0.159	0.046	3.402	0.001
interactivity -> flow	0.132	0.134	0.044	3.004	0.003
memory -> actual visit intention	0.205	0.205	0.048	4.311	0.000
memory -> nostalgia	0.399	0.400	0.037	10.868	0.000
nostalgia -> actual visit intention	0.205	0.206	0.048	4.270	0.000
soundscape -> flow	0.116	0.117	0.042	2.739	0.006
storytelling -> flow	0.130	0.130	0.045	2.891	0.004

Path analysis results provide original sample value (O), sample mean (M), standard deviation (STDEV), T statistic (|O/STDEV|), and P-value. It is a subset of structural equation modeling (SEM) to test the direction and strength of hypothesized variable relationships.

The analysis of the structural model discloses influential relationships that influence travel behavior in the Metaverse. Greater affective bonding with a virtual destination (O = 0.256, T = 5.491, P < 0.001) enhances actual visit intention. The realism dimension positively influenced flow (O = 0.337, T = 8.400, P < 0.001), which shows that realistic virtual worlds are required to facilitate immersive experiences. Flow significantly influences attachment (O = 0.467, T = 13.305, P < 0.001) and memory (O = 0.367, T = 10.370, P < 0.001), validating that flow experiences enhance emotional bonds and recollections. Gamification (O = 0.157, T = 3.402, P = 0.001) and interactivity (O = 0.132, T = 3.004, P = 0.003) also made a significant contribution to flow, although their impacts were smaller. The relationship was established by memory and nostalgia, with memory influencing nostalgia (O = 0.399, T = 10.868, P < 0.001), both of which had causal impacts on visit intention (O = 0.205, P < 0.001). Sensoric features like soundscapes (O = 0.116, T = 2.739, P = 0.006) and narrative features like storytelling (O = 0.130, T = 2.891, P = 0.004) enhanced flow experience, though the effects were minimal. These findings indicate that the creation of an enjoyable and realistic virtual world exerts a significant effect on user attitudes and

behaviors in metaverse tourism.

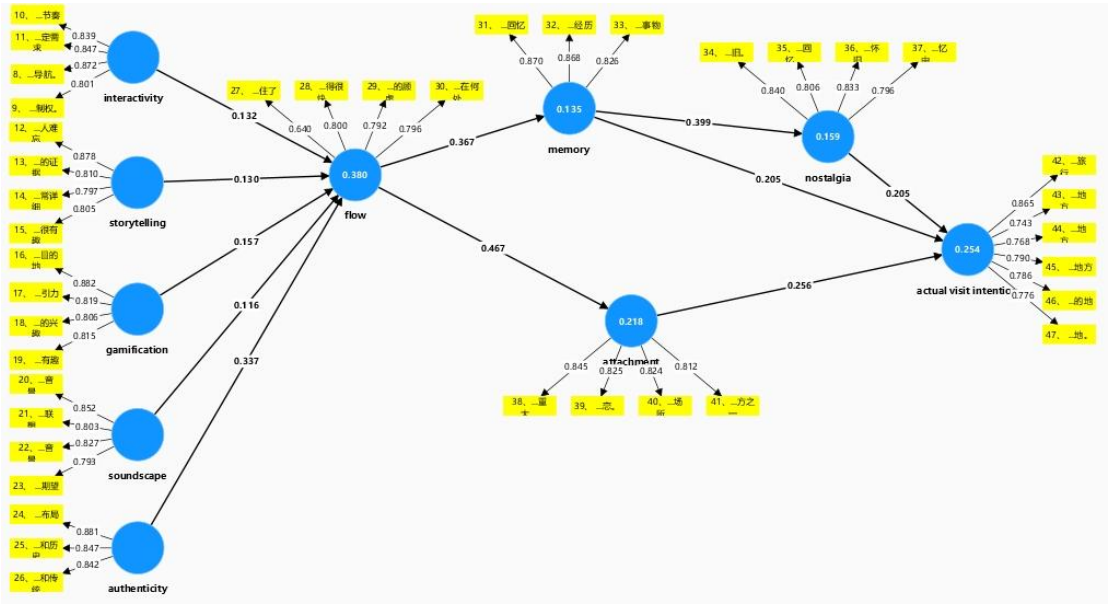

Fig. 2. Structural Equation Modeling Path Diagram

Table 5

Model Evaluation Metrics

	R-square	R-square adjusted	Q-square
actual visit intention	0.254	0.249	0.123
attachment	0.218	0.217	0.207
flow	0.380	0.373	0.363
memory	0.135	0.133	0.180
nostalgia	0.159	0.157	0.084

These results provide three main indicators to interpret the structural model: R-square (the coefficient of determination), adjusted R-square (adjusted coefficient of determination), and Q-square (predictive relevance). These indicators measure how well the model accounts for and forecasts the outcomes regarding the dependent variables: flow, actual visit intention, attachment, memory, and nostalgia.

The R-square values indicate that the model explains 38.0% of the flow variance, which is the construct best explained by the model. Actual visit intention and attachment both have moderate explanatory power, as can be seen from their respective R-square values of 25.4% and 21.8%. The lesser susceptibility to the predictors is evident in memory (R-square=13.5) and nostalgia (R-square=15.9). Adjusted R-square values, only marginally reduced because of adjustments for model complexity, further underpin the robustness of the explanatory power.

The Q-square measures, which are used to estimate the predictive validity of the model, affirm its capability of predicting data outside the sample. The construct of flow has the highest predictive validity with a Q-square measure of 0.363, followed by attachment (Q-square=0.207) and actual visit intention (Q-square=0.123). On the

other hand, memory (Q-square=0.180) and nostalgia (Q-square=0.084) have smaller yet still significant predictive accuracy.

The results show that the model has the highest explanatory and predictive power in the case of flow, followed by attachment and actual visit intention. On the other hand, the comparatively low values attached to memory and nostalgia point to areas where additional predictors or improvements to the model might strengthen its explanatory and predictive power. Results are in support of the legitimacy of the model in identifying the key elements influencing user behaviors within the context of metaverse tourism.

5. Discussion

This study applies the S-O-R model and flow theory to an examination of the effects of virtual destination attributes on tourists' behavioral intentions in the context of metaverse tourism. The results show that such factors as interactivity, storytelling, gamification, soundscapes, and authenticity contribute to the enhancement of flow experiences. The flow experiences then mediate through memories, nostalgia, and attachment to the destination, finally increasing the intention to visit in real life. This research clarifies these complicated interdependencies by integrating data analysis.

Virtual destination characteristics and flow

The most important characteristics of virtual destinations contribute substantially to the flow experience. The primary causes are interactivity and authenticity of the virtual destination. The Fornell Larcker criteria highlight strong correlations between interactivity (INT) and flow (F, r=0.413) and authenticity (AUT) and flow (r=0.512). These findings are consistent with previous research, which strongly underscores the high importance of interactivity in attracting users' attention in virtual settings, a fact corroborated by the work of Arghashi and Yuksel in 2022. The narration techniques exhibit a correlation in this regard on a significant level with a coefficient of r=0.368 in terms of flow and thus demonstrate their usefulness in creating emotional experiences and long-lasting impressions, a fact further supported by research conducted by Zhang and Wang in 2023. Further, aspects such as gamification, which is correlated at r=0.399, along with soundscapes at r=0.363, contribute to enhancing sensory experiences and game-like elements, though it must be mentioned that their effect is somewhat indirect.

In this respect, flow is a critical mediator.

The flow experience mediates the relationship between the features of virtual destinations and several psychological outcomes, which include key aspects of memory, nostalgia, and attachment. This creation of flow is justified by Average Variance Extracted (AVE) values over 0.50, as well as high reliability scores, with flow measured at 0.844. In terms of these metrics, there are significant correlations with memory, as represented by a correlation coefficient of r=0.367, as well as nostalgia, which exhibits a correlation of r=0.398. Flow also has a strong correlation with actual visit intention, as reflected in the score of AVI at r=0.447. Most notably, this reflects the crucial role that flow plays in transposing virtual activity into real-world action, as discussed by Buhalis et al. in their 2023 study.

Memory, nostalgia, and attachment

Memory and nostalgia are important mechanisms affecting attachment and visitation intention. Memory and attachment (ATD, r=0.304) and AVI (r=0.365) showed a moderate correlation, which indicates that positive virtual

experiences leave lasting impressions. Nostalgia (r=0.381 and AVI) connects virtual interaction with cultural heritage and is consistent with previous research findings by Huang and Bu, 2022; Hu and Xu, 2021. The authentic representation of different cultural elements is of utmost importance and plays a crucial role in shaping perceptions, as clearly reflected by the correlation that exists between authenticity and attachment, which is quantified at r=0.410. This finding is consistent with previous research findings from scholars in the field, particularly referencing the works of Earl & Hall in 2023 and Cho in 2021.

Inspiration for marketers and developers

The findings obtained from this study show that tourism marketers should pay high attention to both interactivity and authenticity when they are designing virtual experiences for users. The square root of AVE values, which are determined to be 0.840 for interactivity and 0.857 for authenticity, underlines and highlights the singular importance of these two factors in contributing to successful engagement and user satisfaction. Storytelling is strongly related to nostalgia (r=0.385) and flow (r=0.368), and is another key element of destination marketing. Encourage developers to create a better level of user engagement by including sensory characteristics such as soundscapes (Cronbach's alpha=0.837) and gamification (Cronbach's alpha=0.850). The results support the recommendations of Go and Kang (2023) and Mandal et al. (2024) for developing effective virtual settings.

Problem discussion and future research

This paper also indicates several limitations that have to be put into consideration. First, it only considers respondents who have already used the metaverse before; hence, its generalizability might be constrained by this choice. Other than that, a cross-sectional design has inherent drawbacks, meaning one will never get an answer concerning the long-term effect that memories and nostalgia can produce. In so doing, further studies will, therefore, opt for the longitudinal method since it allows seeing through these dynamics over a prolonged period (Chakraborty et al., 2024). Secondly, it can explore whether the capabilities of AI in personalization and real-time engagement in a metaverse setting create benefits regarding user mobility and emotional bonding. This brings us to the second key point—the cultural awareness involved with virtual environments, besides the immense role that blockchain technology plays in authenticity. This is certainly a subject that requires more and broader research efforts (Hudson et al., 2019).

This study has some surprising findings about metaverse tourism. It shows a great deal of potential for the metaverse to connect virtual experiences with real travel. It will help in the enhancement of sustainable tourism by decreasing tourist mobility and in the conservation of cultural heritage. The interplay of authenticity, fluidity, and attachment fosters emotional connections and engagement with culturally relevant content. The constant upgrade of VR and AR technologies has brought innovation in tourism without limits. This paper will discuss how metaverse tourism may contribute to sustainable development and better global tourism experiences.

6. Conclusion and Implications

This study examines the effects of features related to virtual destinations on tourist behavior in the metaverse using both the Stimulus-Organism-Response framework and Flow Theory. The results show that factors such as interactivity, narrative engagement, gamification, and authenticity have significant effects on flow experiences, which then mediate the relationship between intentions to visit virtually and in real life. The findings especially

showed that the use of storytelling and gamification effectively triggers emotional engagement, while the aspect of authenticity breeds trust and deepens the connection with the destination. This knowledge augments the scant literature on the effects of immersive technologies on tourist behavior and decision-making and, therefore, provides a substantial theoretical and practical foundation for future applications and research in this field.

6.1 Theoretical Implications

This will be of great importance to the theoretical discourse on metaverse tourism by extending the applicability of the S-O-R framework into digital tourism contexts. It flags how virtual destination elements act as stimuli that trigger emotional and cognitive responses, mediated by flow states, to influence behavioral outcomes. Integrating Flow Theory with the S-O-R model sheds new light on the psychological underpinnings of virtual tourism experiences. Moreover, the research highlights the emotional engagement and memory formation through sensory inputs in developing immersive virtual experiences that can have a bearing on actual world behavior. These results enhance the theoretical knowledge of how immersive technologies bridge the gap between virtual and physical tourism, therefore a basis for future interdisciplinary research.

6.2 Practical Implications

The study provides hands-on recommendations for tourism stakeholders and developers concerning the development of effective virtual tourism platforms. Interactivity and user-friendly interfaces are the most critical aspects that will engage users and keep them interested. Storytelling, with its enhancement through cultural narratives and gamified constituents, can be memorable and emotionally resonant; authenticity is a must to further ensure trust and long-term attachment to the destination. Moreover, immersive technologies can enhance user experiences by increasing sensory engagement through visual, auditory, and even haptic feedback. The above methods can be utilized to complement traditional tourism marketing activities by allowing potential tourists a vicarious preview of various places, thereby increasing the likelihood of them actually visiting those places. The findings further encourage the collaboration of tourism marketers with technology developers in the creation of culturally appropriate, interactive, and emotionally engaging virtual experiences aimed at capturing a wide audience base.

6.3 Limitations and Future Research

The current study has certain limitations that provide some future scholarly directions. First, the sample was largely composed of people using the metaverse; it may not capture the broader population of tourists. Therefore, future studies should expand to a larger demographic pool in order to enhance generalizability. Another limitation is that this study has a cross-sectional design; hence, the long-term impact cannot be assessed. Future studies can adopt longitudinal designs to explore how continued exposure to virtual tourism shapes long-term behavioral changes and real-world travel behaviors. Also, it would be relevant to examine the impact of emerging technologies, such as augmented reality (AR) and artificial intelligence (AI), on the development of virtual tourism experiences for deeper understandings. Finally, the cultural and contextual differences in user engagement with virtual destinations would offer critical perspectives toward tailoring virtual tourism experiences to specific markets.

Reference

[1] Abou-Shouk, M., Nagwa Zouair, Ayman Abdelhakim, Hany Roshdy, & Marwa Abdel-Jalil. (2024). The effect of immersive technologies on tourist satisfaction and loyalty: the mediating role of customer engagement and customer perceived value. *International Journal of Contemporary Hospitality Management*. https://doi.org/10.1108/ijchm-09-2023-1496

[2] Adam, I. (2015). Backpackers' risk perceptions and risk reduction strategies in Ghana. Tourism Management, 49, 99–108.

[3] Adnan, N., Rashed, M. F., & Ali, W. (2024). Embracing the metaverse: cultivating sustainable tourism growth on a global scale. *Current Issues in Tourism*, 1-20.

[4] Agapito, D., Pinto, P., & Mendes, J. (2017). Tourists' memories, sensory impressions and loyalty: In loco and post-visit study in southwest Portugal. Tourism Management, 58, 108-118.

[5] Alshurideh, M. T., Kurdi, B. A., Alkurdi, N., & Alshurideh, K. A. (2023). Investigating the impact of metaverse technology adoption in engineering education: A PLS-SEM approach. *Education and Information Technologies, 28*(2), 1471–1490. https://doi.org/10.1007/s10639-023-12127-3

[6] An, S., Choi, Y., & Lee, C. K. (2021). Virtual travel experience and destination marketing: Effects of sense and information quality on flow and visit intention. *Journal of Destination Marketing & Management*, *19*, 100492.

[7] Arghashi, V., & Yuksel, C. A. (2022). Interactivity, inspiration, and perceived usefulness! How retailers' AR-apps improve consumer engagement through flow. *Journal of Retailing and Consumer Services, 64*, 102756. https://doi.org/10.1016/j.jretconser.2021.102756

[8] Bai, W., Wang, J. J., Wong, J. W. C., Han, X., & Guo, Y. (2023). The soundscape and tourism experience in rural destinations: an empirical investigation from Shawan Ancient Town. Humanities and Social Sciences Communications, 11(1), 492.

[9] Barnes, S. J., Mattsson, J., & Sørensen, F. (2016). Remembered experiences and revisit intentions: A longitudinal study of safari park visitors. Tourism Management, 57, 286-294.

[10] Bourlakis, M., Papagiannidis, S., & Li, F. (2009). Retail spatial evolution: Paving the way from traditional to metaverse retailing. Electronic Commerce Research, 9(1), 135-148.

[11] Buhalis, D., & Karatay, N. (2022). Mixed Reality (MR) for Generation Z in Cultural Heritage Tourism Towards Metaverse. *Information and Communication Technologies in Tourism 2022*, 16–27. https://doi.org/10.1007/978-3-030-94751-4_2

[12] Buhalis, D., & Leung, R. (2023). Metaverse as a driver for customer experience and value co-creation: Implications for hospitality and tourism management and marketing. International Journal of Contemporary Hospitality Management, 35(2), 701-716.

[13] Buhalis, D., Leung, D., & Lin, M. (2023). Metaverse as a disruptive technology revolutionising tourism management and marketing. Tourism Management, 97, 104724.

[14] Buzova, D., Sanz-Blas, S., & Cervera-Taulet, A. (2021). "Sensing" the destination: Development of the destination sensescape index. Tourism Management, 87, 104362.

[15] Cao, Y., Qu, X., & Chen, X. (2024). Metaverse application, flow experience, and Gen-Zers' participation intention of intangible cultural heritage communication. *Data Science and Management, 7*, 144–153. https://doi.org/10.1016/j.dsm.2023.12.004

[16] Chakraborty, D., Mehta, P., & Sangeeta Khorana. (2024). Metaverse technologies in hospitality: using the theory of consumption values to reveal consumer attitudes and trust factors. *International Journal of Contemporary Hospitality Management*. https://doi.org/10.1108/ijchm-09-2023-1500

[17] Chan, T. K., Cheung, C. M., & Lee, Z. W. (2017). The state of online impulse-buying research: A literature analysis. Information & Management, 54(2), 204-217.

[18] Cheah, J.-H., Ting, H., Ramayah, T., & Memon, M. A. (2023). Exploring the advancements in PLS-SEM for research in marketing: A focus on SmartPLS 4. *Marketing Letters, 34*(1), 45–59. https://doi.org/10.1057/s41270-023-00266-y

[19] Chen, C. C., & Lin, Y. C. (2018). What drives live-stream usage intention? The perspectives of flow, entertainment, social interaction, and endorsement. Telematics and Informatics, 35(1), 293-303.

[20] Chen, X., Cheng, Z. F., & Kim, G. B. (2020). Make it memorable: Tourism experience, fun, recommendation and revisit intentions of Chinese outbound tourists. Sustainability, 12(5), 1904.

[21] Chen, Z. (2024). Beyond boundaries: exploring the Metaverse in tourism. *International Journal of Contemporary Hospitality Management*. https://doi.org/10.1108/ijchm-06-2023-0900

[22] Cheng, T. M., & Lu, C. C. (2015). The causal relationships among recreational involvement, flow experience, and well-being for surfing activities. Asia Pacific Journal of Tourism Research, 20(sup1), 1486–1504.

[23] Chi, O. H., & Chi, C. G. (2020). Reminiscing other people's memories: Conceptualizing and measuring vicarious nostalgia evoked by heritage tourism. Journal of Travel Research, 61(1), 33-49.

[24] Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research/Lawrence Erlbaum Associates*.

[25] Cho, H. (2021). How nostalgia forges place attachment and revisit intention: A moderated mediation model. *Marketing Intelligence & Planning, 39*(7), 856–870. https://doi.org/10.1108/MIP-02-2020-0073

[26] Cifci, I., Rather, R.A., Taspinar, O., & Altunel, G.K. (2023). Demystifying destination attachment, self-congruity and revisiting intention in dark tourism destinations through the gender-based lens. Tourism Recreation Research, 1-17.

[27] Cowan, K., & Ketron, S. (2019). A dual model of product involvement for effective virtual reality: The roles of imagination, co-creation, telepresence, and interactivity. Journal of Business Research, 100, 483-492.

[28] Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety: Experiencing flow in work and play*. Jossey-Bass.

[29] Csikszentmihalyi, M. (1990). Flow: The psychology of optimal experience. Harper & Row.

[30] da Silva deMatos, N. M., de Sa, E. S., & de Oliveira Duarte, P. A. (2021). A review and extension of the flow experience concept. Insights and directions for Tourism research. *Tourism Management Perspectives*, *38*, 100802.

[31] Daugstad, K. (2008). Negotiating landscape in rural tourism. Annals of Tourism Research, 35(2), 402-426.

[32] Ding, H.-M., & Hung, K.-P. (2021). The antecedents of visitors' flow experience and its influence on memory and behavioural intentions in the music festival context. Journal of Destination Marketing & Management, 19, 100551.

[33] Dwivedi, Y. K., Hughes, L., Wang, Y., Alalwan, A. A., Ahn, S. J., Balakrishnan, J., Barta, S., et al. (2023). Metaverse marketing: how the metaverse will shape the future of consumer research and practice. Psychology & Marketing, 40(4), 750-776.

[34] Earl, A., & Hall, C. M. (2023). Nostalgia and tourism. *Journal of Heritage Tourism*, *18*(3), 307-317.

[35] Fan, X., Jiang, X., & Deng, N. (2022). Immersive technology: A meta-analysis of augmented/virtual reality applications and their impact on tourism experience. Tourism Management, 91, Article 104534.

[36] Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50. https://doi.org/10.1177/002224378101800104

[37] Fu, X., Kang, J., & Tasci, A. (2017). Self-congruity and flow as antecedents of attitude and loyalty towards a theme park brand. Journal of Travel & Tourism Marketing, 34(9), 1261–1273.

[38] G, S., Polisetty, A., Jha, R., & Keswani, S. (2024). Exploring innovation resistance in tourism: barriers to metaverse adoption among tourists. *Cogent Business & Management*, *11*(1). https://doi.org/10.1080/23311975.2024.2400309

[39] Ghali, Z., Rather, R. A., & Khan, I. (2024). Investigating metaverse marketing-enabled consumers' social presence, attachment, engagement and (re)visit intentions. *Journal of Retailing and Consumer Services*, *77*, 103671. https://doi.org/10.1016/j.jretconser.2023.103671

[40] Go, H., & Kang, M. (2023). Metaverse tourism for sustainable tourism development: Tourism agenda 2030. Tourism Review, 78(2), 381-394.

[41] Goodman, L. A. (1961). Snowball sampling. *The annals of mathematical statistics*, 148-170.

[42] Guo, Y., Zhang, K., & Wang, C. (2022). Way to success: Understanding top streamer's popularity and influence from the perspective of source characteristics. Journal of Retailing and Consumer Services, 64, 102786.

[43] Gursoy, D., Malodia, S., & Dhir, A. (2022). The metaverse in the hospitality and tourism industry: An overview of current trends and future research directions. Journal of Hospitality Marketing & Management, 31(5), 527-534.

[44] Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2019). A primer on partial least squares structural equation modeling (PLS-SEM) (2nd ed.). Sage Publications.

[45] Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long range planning*, *46*(1-2), 1-12.

[46] Hair, J. F., Sarstedt, M., Pieper, T. M., & Ringle, C. M. (2012). The use of partial least squares structural equation modeling in strategic management research: a review of past practices and recommendations for future applications. *Long range planning*, *45*(5-6), 320-340.

[47] Halpenny, E.A. (2006). Environmental behaviour, place attachment and park visitation: A case study of visitors to Point Pelee National Park [Doctoral dissertation]. University of Waterloo.

[48] Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. Computers in Human Behavior, 54, 170-179.

[49] Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing, 20*, 277–319. https://doi.org/10.1108/S1474-7979(2009)0000020014

[50] Hidalgo, M.C., & Hernandez, B. (2001). Place attachment: Conceptual and empirical questions. Journal of Environmental Psychology, 21(3), 273-281.

[51] Hoffman, D. L., & Novak, T. P. (2009). Flow online: Lessons learned and future prospects. Journal of Interactive Marketing, 23(1), 23-34.

[52] Holbrook, M. B., & Schindler, R. M. (1994). Age, sex, and attitude toward the past as predictors of consumers' aesthetic tastes for cultural products. Journal of Marketing Research, 31(4), 412-422.

[53] Hu, Y., & Xu, S. (2021). Memorability of a previous travel experience and revisit intention: The three-way interaction of nostalgia, perceived disappointment risk, and extent of change. *Journal of Destination Marketing & Management, 20*, 100604. https://doi.org/10.1016/j.jdmm.2021.100604

[54] Huang, C. T., & Chen, P. T. (2020). Do reward programs truly build loyalty for lodging industry? International Journal of Hospitality Management, 29(1), 128-135.

[55] Huang, H. M., Rauch, U., & Liaw, S. S. (2010). Investigating learners' attitudes toward virtual reality learning environments: Based on a constructivist approach. Computers & Education, 55(3), 1171-1182.

[56] Huang, R., & Bu, H. M. (2022). Destination attributes of memorable Chinese rural tourism experiences: Impact on positive arousal, memory, and behavioral intention. *Psychology Research and Behavior Management, 15*, 3639–3661. https://doi.org/10.2147/PRBM.S384556

[57] Huang, S., & Hsu, C. H. C. (2009). Travel motivation: Linking theory to practice. *International Journal of Culture, Tourism and Hospitality Research, 3*(4), 287–295. https://doi.org/10.1108/17506180910994505

[58] Huang, T. L., & Hsu Liu, F. (2014). Formation of augmented-reality interactive technology's persuasive effects from the perspective of experiential value. Internet Research, 24(1), 82-109.

[59] Huang, Y., Li, L., Lee, H., & Browning, M. H. E. M. (2023). Surfing in virtual reality: An application of extended technology acceptance model with flow theory. *Computers in Human Behavior Reports, 9*, 100252. https://doi.org/10.1016/j.chbr.2022.100252

[60] Hudson, S., Matson-Barkat, S., Pallamin, N., & Jegou, G. (2019). With or without you? Interaction and immersion in a virtual reality experience. *Journal of business research*, *100*, 459-468.

[61] Jafar, R. M. S., & Ahmad, W. (2023). Tourist loyalty in the metaverse: the role of immersive tourism experience and cognitive perceptions. *Tourism Review*, *79*(2), 321-336.

[62] Jafar, R. M. S., Ahmad, W., & Chen, Y. (2024). Metaverse in human behavior: The role of telepresence and flow experience on consumers' shopping behavior in the metaverse. *SAGE Open, 14*(1), 1–13. https://doi.org/10.1177/21582440241261256

[63] Jee, T. W., Zhao, S. D., Wee, G. W. E., Kalantari, H. D., & Wei-Han Tan, G. (2024). Indulging in virtual luxuries: unveiling the allure of impulse buying in metaverse. *Asia Pacific Journal of Marketing and Logistics*.

[64] Jiang, J., & Yan, B. (2022). From soundscape participation to tourist loyalty in nature-based tourism: The moderating role of soundscape emotion and the mediating role of soundscape satisfaction. *Journal of Destination Marketing & Management, 26*, 100730. https://doi.org/10.1016/j.jdmm.2022.100730

[65] Jiang, J., Zhang, J., Zhang, H., & Yan, B. (2017). Natural soundscapes and tourist loyalty to nature-based tourism destinations: The mediating effect of tourist satisfaction. Journal of Travel & Tourism Marketing, 35(2), 218-230.

[66] Kankhuni, Z., & Ngwira, C. (2021). Overland tourists' natural soundscape perceptions: influences on experience, satisfaction, and electronic word-of-mouth. Tourism Recreation Research, 47(5-6), 591-607.

[67] Khan, M. J., Chelliah, S., & Amin, S. (2018). Perceived risks, travel constraints and visit intention of young women travelers: The moderating role of travel motivation. *Tourism Review, 74*(3), 721–738. https://doi.org/10.1108/TR-08-2018-0116

[68] Kim, D. Y., Choi, D., Yoon, N., & Lee, H. (2024, January). Feeling of Being Together in the Metaverse: Positive Influence of Copresence on Subjective Well-being. In *International Textile and Apparel Association Annual Conference Proceedings* (Vol. 80, No. 1). Iowa State University Digital Press.

[69] Kim, J. H., & Chen, J. S. (2019). The memorable travel experience and its reminiscence functions. Journal of Travel Research, 58(4), 637-649.

[70] Kim, J. H., & Jang, S. C. (2016). Memory retrieval of cultural event experiences: Examining internal and external influences. Journal of Travel Research, 55(3), 322-339.

[71] Kim, J. H., Ritchie, J. R. B., & McCormick, B. (2012). Development of a scale to measure memorable tourism experiences. Journal of Travel Research, 51(1), 12-25.

[72] Kim, M. J., & Hall, C. M. (2019). A hedonic motivation model in virtual reality tourism: Comparing visitors and non-visitors. *International Journal of Information Management*, *46*, 236-249.

[73] Kim, M. J., Lee, C. K., & Jung, T. (2020). Exploring consumer behavior in virtual reality tourism using an extended stimulus-organism-response model. Journal of Travel Research, 59(1), 69-89.

[74] Kim, M., & Thapa, B. (2018). Perceived value and flow experience: Application in a nature-based tourism context. Journal of Destination Marketing & Management, 8, 373–384.

[75] Kim, Y. N., Lee, Y., Suh, Y. K., & Kim, D. Y. (2021). The effects of gamification on tourist psychological outcomes: an application of letterboxing and external rewards to maze park. Journal of Travel & Tourism Marketing, 38(4), 341-355.

[76] Kim, Y., Ribeiro, M. A., & Li, G. (2022). Tourism memory, mood repair and behavioral intention. Annals of Tourism Research, 93, 103369.

[77] Koo, C., Joun, Y., Han, H., & Chung, N. (2016). A structural model for destination travel intention as a media exposure: Belief-desire-intention model perspective. *International Journal of Contemporary Hospitality Management, 28*(7), 1338–1361. https://doi.org/10.1108/IJCHM-07-2014-0354

[78] Koo, C., Kwon, J., Chung, N., & Kim, J. (2023). Metaverse tourism: conceptual framework and research propositions. *Current Issues in Tourism*, *26*(20), 3268-3274.

[79] Kowalczuk, P., Siepmann, C., & Adler, J. (2021). Cognitive, affective, and behavioral consumer responses to augmented reality in e-commerce: A comparative study. Journal of Business Research, 124, 357-373.

[80] Kyle, G., Graefe, A., & Manning, R. (2005). Testing the dimensionality of place attachment in recreational settings. Environment and Behavior, 37(2), 153-177.

[81] Leclercq, T., Poncin, I., & Hammedi, W. (2020). Opening the black box of gameful experience: Implications for gamification process design. Journal of Retailing and Consumer Services, 52, 101882.

[82] Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years? Journal of Environmental Psychology, 31(3), 207-230.

[83] Li, J., Peng, X., Liu, X., Tang, H., & Li, W. (2024). A study on shaping tourists' conservational intentions towards cultural heritage in the digital era: Exploring the effects of authenticity, cultural experience, and place attachment. *Journal of Asian Architecture and Building Engineering*. https://doi.org/10.1080/13467581.2023.2234567

[84] Li, N., Li, L., Chen, X., & Wong, I. A. (2024). Digital destination storytelling: Narrative persuasion effects induced by story satisfaction in a VR context. *Journal of Hospitality and Tourism Management, 58*, 184–196. https://doi.org/10.1016/j.jhtm.2024.01.002

[85] Li, Y., & Peng, Y. (2021). What drives gift-giving intention in live streaming? The perspectives of emotional attachment and flow experience. International Journal of Human–Computer Interaction, 37(14), 1317-1329.

[86] Liu, A., Wang, X. L., Liu, F., Yao, C., & Deng, Z. (2018). Soundscape and its influence on tourist satisfaction. The Service Industries Journal, 38(3-4), 164-181.

[87] Liu, H., & Park, K. (2024). Exploring the impact of metaverse tourism experiences on actual visit intentions: An integrated model of presence, the Technology Acceptance Model, and the Theory of Planned Behavior. *International Journal of Tourism Research/□the □International Journal of Tourism Research*, *26*(1). https://doi.org/10.1002/jtr.2616

[88] Liu, H., Park, K.-S., & Wei, Y. (2024). An extended stimulus-organism-response model of Hanfu experience in cultural heritage tourism. Journal of Vacation Marketing. https://doi.org/10.1177/13567667221135197

[89] Lu, Y. H., Zhang, J., Zhang, H., Xiao, X., Liu, P., Zhuang, M., & Hu, M. (2022). Flow in soundscape: The conceptualization of soundscape flow experience and its relationship with soundscape perception and behaviour intention in tourism destinations. Current Issues in Tourism, 25(13), 2090-2108.

[90] Lu, Y., Lai, I. K. W., Liu, X. Y., & Wang, X. (2022). Influence of memorability on revisit intention in welcome back tourism: The mediating role of nostalgia and destination attachment. Frontiers in Psychology, 13, 1020467.

[91] Luo, Z. (2023). Determinants of the perceived usefulness (PU) in the context of using gamification for classroom-based ESL teaching: A scale development study. *Education and Information Technologies, 28*(4), 4741–4768. https://doi.org/10.1007/s10639-023-11645-3

[92] Ma, J., Scott, N., & Wu, Y. (2023). Tourism destination advertising: effect of storytelling and sensory stimuli on arousal and memorability. Tourism Review, 79(3), 671-687.

[93] Maghrifani, D., Liu, F., & Sneddon, J. (2021). Understanding potential and repeat visitors' travel intentions: The roles of travel motivations, destination image, and visitor image congruity. *Journal of Travel Research, 61*(5), 1121–1137. https://doi.org/10.1177/00472875211018508

[94] Mahmoud, A. B., Fuxman, L., Asaad, Y., & Konstantinos Solakis. (2024). Exploring new realms or losing touch? Assessing public beliefs about tourism in the metaverse–a big-data approach. *International Journal of Contemporary Hospitality Management*. https://doi.org/10.1108/ijchm-09-2023-1515

[95] Mandal, S., Paul, J., Kotni, V.V.D.P., & Chintaluri, M.G. (2024). The orientation of Gen Zs towards metaverse tourism. Journal of Destination Marketing & Management, 32, Article 100871.

[96] Martin, J. (2008). Consuming code: Use-value, exchange-value, and the role of virtual goods in Second Life. Journal for Virtual Worlds Research, 1(2), 1-21.

[97] McCann, W. H. (1941). Nostalgia: A review of the literature. Psychological Bulletin, 38(3), 165-182.

[98] McMillan, S. J., & Hwang, J. S. (2002). Measures of perceived interactivity: An exploration of the role of direction of communication, user control, and time in shaping perceptions of interactivity. Journal of Advertising, 31(3), 29-42.

[99] Mehrabian, A., & Russell, J. A. (1974). An approach to environmental psychology. MIT Press.

[100] Moin, S. M. A., Hosany, S., & O'Brien, J. (2020). Storytelling in destination brands' promotional videos. Tourism Management Perspectives, 34, 100639.

[101] Moore, K., Buchmann, A., Månsson, M., & Fisher, D. (2021). Authenticity in tourism theory and experience. Practically indispensable and theoretically mischievous? Annals of Tourism Research, 89, 103208.

[102] Moore, R.L., & Graefe, A.R. (1994). Attachments to recreation settings: The case of rail-trail users. Leisure Sciences, 16(1), 17-31.

[103] Nah, F. F.-H., Eschenbrenner, B., & Chen, L. (2025). Flowing together or alone: Impact of collaboration in the metaverse. *Decision Support Systems, 188*, 114346. https://doi.org/10.1016/j.dss.2024.114346

[104] Nah, F.F.H., Eschenbrenner, B., & DeWester, D. (2011). Enhancing brand equity through flow and telepresence: A comparison of 2D and 3D virtual worlds. MIS Quarterly, 35(3), 731-747.

[105] Natarajan, T., Pragha, P., Dhalmahapatra, K., & Veera Raghavan, D. R. (2024). Exploring tourist's metaverse experience using destination spatial presence quality & perceived augmentation: metaverse exploration, physical expedition (MEPE). *Current Issues in Tourism*, 1-23.

[106] Nguyen, T. H. H. (2020). A reflective–formative hierarchical component model of perceived authenticity. Journal of Hospitality & Tourism Research, 44(8), 1211-1234.

[107] Özdemir Uçgun, G., & Şahin, S. Z. (2024). How does Metaverse affect the tourism industry? Current practices and future forecasts. *Current Issues in Tourism*, *27*(17), 2742-2756.

[108] Parapanos, D., & Michopoulou, E. (2021). Gamification, game mechanics, game thinking and players' profile and life cycle. In F. Xu & D. Buhalis (Eds.), Gamification for tourism (pp. 13-34). Multilingual Matters.

[109] Park, E., Choi, B. K., & Lee, T. J. (2019). The role and dimensions of authenticity in heritage tourism. *Tourism Management*, *74*, 99-109.

[110] Park, Y., Ko, E., & Do, B. (2023). The perceived value of digital fashion product and purchase intention: the mediating role of the flow experience in metaverse platforms. *Asia Pacific Journal of Marketing and Logistics*, *35*(11), 2645-2665.

[111] Peng, J., Yang, X., Fu, S., & Huan, T.C.T. (2022). Exploring the influence of tourists' happiness on revisit intention in the context of Traditional Chinese Medicine cultural tourism. Tourism Management, 94, 104647.

[112] Prentice, R. (2004). Tourist familiarity and imagery. *Annals of Tourism Research, 31*(4), 923–945. https://doi.org/10.1016/j.annals.2004.02.004

[113] Privitera, A. G., Fontana, F., & Geronazzo, M. (2023). The Role of Audio in Immersive Storytelling: a Systematic Review in Cultural Heritage. Multimedia Tools and Applications. https://doi.org/10.1007/s11042-024-19288-4

[114] Qiu, M., Jin, X., & Scott, N. (2021). Sensescapes and attention restoration in nature-based tourism: Evidence from China and Australia. Tourism Management Perspectives, 39, 100855.

[115] Ramkissoon, H., Smith, L.D.G., & Weiler, B. (2013). Testing the dimensionality of place attachment and its relationships with place satisfaction and pro-environmental behaviours: A structural equation modelling approach. Tourism Management, 36, 552-566.

[116] Reisinger, Y., & Mavondo, F. T. (2005). Travel anxiety and intentions to travel internationally: Implications of travel risk perception. *Journal of Travel Research, 43*(3), 212–225. https://doi.org/10.1177/0047287504272017

[117] Rickly, J. M. (2022). A review of authenticity research in tourism: launching the annals of tourism research curated collection on authenticity. Annals of Tourism Research, 92, 103349.

[118] Salet, X. (2021). The search for the truest of authenticities: online travel stories and their depiction of the authentic in the platform economy. Annals of Tourism Research, 88, 103175.

[119] Scannell, L., & Gifford, R. (2010). Defining place attachment: A tripartite organizing framework. Journal of Environmental Psychology, 30(1), 1-10.

[120] Schroeder, J. (2002). Visual Consumption. Routledge.

[121] Sedikides, C., & Wildschut, T. (2016). Past forward: Nostalgia as a motivational force. Trends in Cognitive Sciences, 20(5), 319-321.

[122] Sedikides, C., Wildschut, T., Routledge, C., Arndt, J., Hepper, E. G., & Zhou, X. (2015). To nostalgize: Mixing memory with affect and desire. Advances in Experimental Social Psychology, 51, 189-273.

[123] Skinner, H., Sarpong, D., & White, G. R. (2018). Meeting the needs of the Millennials and Generation Z: Gamification in tourism through geocaching. Journal of Tourism Futures, 4(1), 93-104.

[124] Soriani, S., Bertazzon, S., Cesare, F. D., & Rech, G. (2009). Cruising in the Mediterranean: structural aspects and evolutionary trends. *Maritime Policy & Management*, *36*(3), 235-251.

[125] Sparkes, M. (2021). What is a metaverse. New Scientist, 251(3348), 18.

[126] Sreejesh, S., Anusree, M. R., & Ponnam, A. (2018). Does game rules work as a game changer? Analyzing the effect of rule orientation on brand attention and memory in advergames. Computers in Human Behavior, 81, 325–339.

[127] Tan, W.-K., & Wu, C.-E. (2016). An investigation of the relationships among destination familiarity, destination image and future visit intention. *Journal of Destination Marketing & Management, 6*(3), 181–189. https://doi.org/10.1016/j.jdmm.2015.12.008

[128] Tsai, C. T., Hsu, H., & Chen, C. C. (2020). An examination of experiential quality, nostalgia, place attachment and behavioral intentions of hospitality customers. Journal of Hospitality Marketing & Management, 29(8), 869-885.

[129] Tsai, S. (2022). Investigating metaverse marketing for travel and tourism. *Journal of Vacation Marketing*, 135676672211457. https://doi.org/10.1177/13567667221145715

[130] Tsai, S. P. (2024). Investigating metaverse marketing for travel and tourism. *Journal of Vacation Marketing*, *30*(3), 479-488.

[131] Tuan, Y.F. (1977). Space and place: The perspective of experience. University of Minnesota Press.

[132] van Berlo, Z. M. C., & Stikos, D. (2023). Augmented Reality (AR) Brand Storytelling: The Role of Flow in Attitude Formation and Associative Learning. In T. Jung, M. C. tom Dieck, & P. A. Rauschnabel (Eds.), Extended Reality in Tourism, Events and Marketing (pp. 72-84). Springer, Cham.

[133] Víctor Calderón-Fajardo, Puig-Cabrera, M., & Rodríguez-Rodríguez, I. (2024). Beyond the real world: Metaverse adoption patterns in tourism among Gen Z and Millennials. *Current Issues in Tourism*, 1–21. https://doi.org/10.1080/13683500.2024.2330675

[134] Wang, J., Sun, Y., Zhang, L., Zhang, S., Feng, L., & Morrison, A. M. (2024). Effect of display methods on intentions to use virtual reality in museum tourism. *Journal of Travel Research*, *63*(2), 314-334.

[135] Watts, G. R., & Pheasant, R. J. (2015). Tranquillity in the Scottish Highlands and Dartmoor National Park – The importance of soundscapes and emotional factors. Applied Acoustics, 89, 297-305.

[136] Wei, W. (2024). A buzzword, a phase or the next chapter for the Internet? The status and possibilities of the metaverse for tourism. Journal of Hospitality and Tourism Insights, 7(1), 602-625.

[137] Willems, K., Brengman, M., & Van Kerrebroeck, H. (2019). The impact of representation media on customer engagement in tourism marketing among millennials. European Journal of Marketing, 53(9), 1988-2017.

[138] Wu, C. H. J., & Liang, R. D. (2011). The relationship between white-water rafting experience formation and customer reaction: A flow theory perspective. Tourism Management, 32(2), 317–325.

[139] Wu, Q., & Wang, J. (2024). Exploring the nexus between usage motivation and behavioral intention in metaverse hospitality and tourism: moderation and mediation insights. *International Journal of Contemporary Hospitality Management*.· · Kılıçarslan, Ö., Yozukmaz, N., Albayrak, T., & Buhalis, D. (2024). The impacts of Metaverse on tourist behaviour and marketing implications. *Current Issues in Tourism*, 1-21.

[140] Wu, X., & Lai, I. K. W. (2022). The use of 360-degree virtual tours to promote mountain walking tourism: Stimulus–organism–response model. *Information Technology & Tourism, 24*, 85–107. https://doi.org/10.1007/s40558-021-00218-1

[141] Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. Tourism Management, 60, 244-256.

[142] Xu, F., Tian, F., Buhalis, D., Weber, J., & Zhang, H. (2016). Tourists as mobile gamers: Gamification for tourism marketing. Journal of Travel & Tourism Marketing, 33(8), 1124-1142.

[143] Yang, S. (2023). Storytelling and user experience in the cultural metaverse. Heliyon, 9(4), e14795.

[144] Yim, M. Y. C., Chu, S. C., & Sauer, P. L. (2017). Is augmented reality technology an effective tool for e-commerce? An interactivity and vividness perspective. Journal of Interactive Marketing, 39, 89-103.

[145] Yin, C. Y., Poon, P., & Su, J. L. (2017). Yesterday once more? Autobiographical memory evocation effects on tourists' post-travel purchase intentions toward destination products. Tourism Management, 61, 263-274.

[146] Ying, T., Tang, J., Ye, S., Tan, X., & Wei, W. (2021). Virtual reality in destination marketing: Telepresence, social presence, and tourists' visit intentions. Journal of Travel Research, 61(8), 1738-1756.

[147] Yoon, S., & Nam, Y. (2024). Metaverse engagement and Korea travel intentions: Understanding affordances, presence, and place attachment among Brazilian ZEPETO users. *Journal of Destination Marketing & Management, 31*, 100865. https://doi.org/10.1016/j.jdmm.2024.100865

[148] Yuksel, A., Yuksel, F., & Bilim, Y. (2010). Destination attachment: Effects on customer satisfaction and cognitive, affective and conative loyalty. Tourism Management, 31(2), 274-284.

[149] Yung, R., Khoo-Lattimore, C., & Potter, L. E. (2021). VR the world: Experimenting with Emotion and Presence for Tourism Marketing. *Journal of Hospitality and Tourism Management*, *46*(3), 160–171.

[150] Zavareh, F. B., Ariff, M. S. M., Jusoh, A., Zakuan, N., Bahari, A. Z., & Ashourian, M. (2012). E-service quality dimensions and their effects on e-customer satisfaction in internet banking services. *Procedia-social and behavioral sciences*, *40*, 441-445.

[151] Zhang, S. N., Li, Y. Q., Liu, C. H., & Ruan, W. Q. (2019). How does authenticity enhance flow experience through perceived value and involvement: the moderating roles of innovation and cultural identity. Journal of Travel & Tourism Marketing, 36(6), 710-728.

[152] Zhang, W., & Wang, Y. (2023). An empirical study of the impact of metaverse storytelling on intentions to visit. *Information Technology & Tourism, 25*(3), 411–432. https://doi.org/10.1007/s40558-023-00243-8

[153] Zhang, X., Chen, Z., & Jin, H. (2020). The effect of tourists' autobiographical memory on revisit intention: Does nostalgia promote revisiting? Asia Pacific Journal of Tourism Research, 25(2), 147-166.

[154] Zheng, X., & Fu, S. (2024). Tourism live streaming: uncovering the effects of responsiveness and knowledge spillover on travelling intentions. Tourism Review, 79(5), 1126-1146.

[155] Zhu, J., Jiang, Y., Jiang, Y., Wang, Y., & Yang, Q. (2023). The effectiveness of social elements in virtual reality tourism: A mental imagery perspective. *Journal of Hospitality and Tourism Management, 56*, 135–146. https://doi.org/10.1016/j.jhtm.2023.03.011

[156] Zhu, S., Gupta, A., Paradice, D., & Cegielski, C. (2018). Understanding the Impact of Immersion and Authenticity on Satisfaction Behavior in Learning Analytics Tasks. *Information Systems Frontiers*, *21*(4), 791–814. https://doi.org/10.1007/s10796-018-9865-4