



Play alone or play together? A comparative study of single- and multi-person interactions in virtual tourism

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Abstract

Purpose – This paper aims to compare the differences between single- and multi-person interactions in virtual tourism, underpinned by the stimulus-organism-response (S-O-R) framework and media richness theory (MRT).

Design/methodology/approach – In this study, quantitative data gathered from questionnaires applied to 558 individuals was analyzed by utilizing PLS-SEM. The moderating role of interaction type was tested through multi-group difference analysis (MGA).

Findings - The results showed that vividness positively influenced telepresence, perceived attractiveness, and authentic experiences; telepresence positively affected authentic experiences and perceived attractiveness; and authentic experiences and perceived attractiveness positively impacted willingness to visit in both interaction groups. A difference was detected between the two groups in that perceptions of media vividness were more easily transformed into a willingness to visit through telepresence in the multi-person interaction group. Interaction type moderated the effect of vividness on telepresence. The vividness of the media had a more significant effect on telepresence among those who participated in virtual tourism together.

Originality/value – In this study, a model was developed to explain how media vividness affected willingness to visit by considering the relationships between telepresence, authentic experiences, and perceived attractiveness in virtual reality, as well as the social interaction aspect.

Keywords: virtual tourism, media richness, stimulus-organism-response (S-O-R), telepresence, authentic experience, perceived attractiveness

1 Introduction

The tourism industry has been significantly impacted by the emergence of VR, AR, and the metaverse, giving rise to new opportunities for tourism and virtual tourism (Liu *et al.*, 2024; Zhang, *et al.*, 2022). The global VR market in 2022 was valued at approximately \$12 billion and is expected to grow to \$22 billion by 2025 (Statista, 2022). Virtual environments allow tourists to interact with destinations before visiting. Tourists, as “players,” can experience 3D

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3 virtual environments with vivid visual content through online media (Gutiérrez *et al.*, 2008).
4 These immersive technologies are becoming essential tools for destination marketing.
5 Traditionally, destinations relied on still images in magazines and brochures for depiction and
6 advertising (Choi *et al.*, 2018). Virtual tourism is increasingly important in destination
7 marketing, as it can effectively motivate tourists to visit destinations after experiencing them
8 in VR. As the metaverse advances, technology will generate even more significant changes.
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13 The Internet and virtual technology enable users to communicate and interact in an
14 entirely new way (Guttentag, 2010). With the advent of digital media, interactivity has become
15 an essential element of virtual tourism (Leung *et al.*, 2022). Virtual interactions are receiving
16 increasing attention from researchers and practitioners (Zhao *et al.*, 2022). However, as a
17 critical component of tourism experiences, interaction scenarios are seldom explored in virtual
18 tourism (Wong *et al.*, 2023). The emergence of the metaverse, in particular, offers new
19 opportunities to enhance collaboration and social connections. In virtual tourism, groups can
20 browse digital replicas of their destinations together and engage in real-time discussions. With
21 spatial audio, haptic feedback, avatars, and NPCs (non-player characters), virtual tourism
22 provides multifaceted, multi-person experiences (Miao *et al.*, 2024; Zhao *et al.*, 2022).
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31 In current research on virtual tourism, researchers are examining how new technologies
32 affect the willingness to travel. Tourist psychologies and behaviors in virtual tourism, such as
33 motivations, perceptions, experiences, and visit intentions, have been investigated (El-Said and
34 Aziz, 2022). Virtual tourism experiences have been studied primarily from single-person or
35 non-interpersonal perspectives (Leung *et al.*, 2022). Some research has addressed the feelings
36 of loneliness and isolation in virtual travel due to the lack of interaction with others (Merckx
37 and Nawijn, 2021). However, how tourist perceptions convert into visit intentions from an
38 interactive perspective remains unexplored. Thus, this research attempted to bridge a
39 knowledge gap by linking vividness, telepresence, authentic experience, perceived
40 attractiveness, and willingness to visit. This research, grounded in the Stimulus-Organism-
41 Response (S-O-R) framework and media richness theory (MRT), delineates a theoretical model
42 by linking media characteristics and willingness to visit. The moderating effect of interaction
43 type (single- and multi-person interactions) is also examined. The study focused on two issues:
44 (1) What are the transformative paths from media characteristics to visit willingness? (2) How
45 do different interactive types influence this process?
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2 Literature review and hypotheses development

2.1 Theoretical background

This research is based on the S-O-R framework, a general model for understanding environmental influences on human responses, consisting of three key elements: stimulus, organism, and response. The framework posits that stimuli (S) are the antecedents of inner organismic conditions (O), resulting in approach reactions (R) (Jacoby, 2002). In virtual tourism, the virtual environment itself is the main stimulus factor. The sensory elements, interactive functions, and social cues embedded in virtual environments cause various organic user reactions, including senses of presence and immersion, which drive various behaviors and intentions. For example, the experience of a 360-degree virtual mountain hiking tour was analyzed (Wu and Lai, 2022). Additionally, studies have explored the positive and negative attitudes and travel intentions of individuals toward the social elements of VR travel scenarios (Zhu *et al.*, 2023). Li *et al.* (2024b) investigated the impact of technology on flow experience, emotional experience, and behavioral intention during VR tourism.

Media richness theory is also used in this research. The richness of media refers to its ability of media to convey rich visual and informational content (Lee *et al.*, 2009; Tseng *et al.*, 2022; Zhu *et al.*, 2024a). It emphasizes the importance of communication channel characteristics for effective communication (Ishii *et al.*, 2019; Zhu *et al.*, 2024a). As new media and computer-mediated environments (CMEs) develop, media interactivity and vividness have become increasingly important (Fortin and Dholakia, 2005; Zhu *et al.*, 2024a). Experiences based on the virtual world rely heavily on media characteristics (Klein, 2003). In the tourism field, interactivity and vividness are considered environmental cues that promote tourist affective responses (Kim and Ko, 2019). Therefore, MRT helps explain why certain media features induce positive tourism experiences (Grewal *et al.*, 2021; Wang *et al.*, 2024; Wu *et al.*, 2021).

2.2 Virtual tourism

There are two definitions of virtual tourism. Broadly speaking, virtual tourism is defined as the experience of visiting a tourist destination through computer-mediated technology, including using 360-degree online media (Baek *et al.*, 2020; Calisto and Sarkar, 2024). This experience is also known as non-immersive VR in tourism (Beck *et al.*, 2019), like web-mediated 3D-based information (e.g., virtual tours or Second Life), and mobile-mediated tourism (Ghorbanzadeh, 2022). Specifically, virtual tourism refers to surreal experiences achieved

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3 through visualization technology (Calisto and Sarkar, 2024). In this study, the researchers used
4 the broad definition. For the experimental material, virtual video games with 360° miniature
5 Los Angeles landscapes were chosen. In video games, fantasy and reality blur, allowing
6 viewers to experience virtual travel destinations, and stimulating the desire to visit actual
7 destinations. In some ways, video games can be viewed as virtual tourism-related media
8 (Calisto and Sarkar, 2024; Dubois and Gibbs, 2018; Sharma *et al.*, 2022).
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15 **2.3 Vividness and telepresence**

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17 Vividness is defined as “the intensity with which a mediated environment can present
18 information to the senses” (Li *et al.*, 2002), and it is one of the antecedents of telepresence
19 (Klein, 2003; Whang *et al.*, 2021). It includes both the depth and breadth of media. The former
20 pertains to the quality of information received by the user, while the latter refers to the number
21 of sensory dimensions provided by the media (Fan *et al.*, 2022; Kim and Ko, 2019).
22 Telepresence is defined as sensing “being” in an environment via communication media (Choi
23 *et al.*, 2016). Some studies indicate that telepresence is related to both vividness and
24 interactivity (Steuer, 1992). In this study, we focus on vividness, as previous research has
25 demonstrated that vividness is three times as influential as interactivity (Van Kerrebroeck *et*
26 *al.*, 2017). Moreover, the virtual tourism in this study is based on a 360° panoramic video, and
27 prior research specifically emphasizes that this type of media has a greater impact on vividness
28 than on interactivity (Hyun *et al.*, 2009). Many scholars have demonstrated that rich media
29 such as video, audio, and 3D can enhance vividness, thereby creating more telepresence
30 (Algharabat *et al.*, 2018; Steuer *et al.*, 1995; Zhu *et al.*, 2023). Therefore, the following
31 hypothesis was proposed:
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43 H₁: Vividness positively affects telepresence.
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46 **2.4 Authentic experiences and perceived attractiveness**

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48 The authentic experience of tourists refers to their perception of how genuine their experiences
49 are and their level of enjoyment (Kolar and Zabkar, 2010). In short, an authentic experience is
50 original, exceptional, or unique (Kim *et al.*, 2020). Virtual tourists are presumed to emphasize
51 authenticity due to their immersion in sensory experiences in virtual worlds (Zhang *et al.*, 2022).
52 This may be because the features of the media, such as vividness, bring about rich sensory
53 participation (Mura *et al.*, 2017). In addition, the virtual environment is filled with sound,
54 visual components, and 3D models, which makes visitors feel like they are in the “real world”
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(Gao *et al.*, 2022). When people feel as if they are in the real world, they experience telepresence. The following hypotheses were proposed.

H₂: Vividness positively affects authentic experiences.

H₃: Telepresence positively affects authentic experiences.

Perceived attractiveness is often used as an aesthetic dimension in game design to study users' willingness to engage (Molinillo *et al.*, 2020). This research defined perceived attractiveness as "the visual and auditory attractiveness felt by the tourists during the virtual tourism experience" (Ha *et al.*, 2007). The antecedents of perceived attractiveness have been studied in the past, such as perceived sensory simulations (Wei *et al.*, 2022), vividness (Huang, 2016), and telepresence (Li and Peng, 2021). In the virtual tourism experience, the motor center of the brain is affected by visual information and motor activities, stimulating people's imagination of the virtual experience. Simultaneously, this exploration provides a higher hedonic experience (Huang *et al.*, 2016; Van Kerrebroeck *et al.*, 2017). Based on this, the following hypotheses were proposed:

H₄: Vividness positively affects perceived attractiveness.

H₅: Telepresence positively affects perceived attractiveness.

2.5 Willingness to visit

Numerous studies have established a link between telepresence and travel intentions. Telepresence occurs during virtual experiences, particularly in the marketing of services (Ongsakul *et al.*, 2017). This phenomenon leverages technological mediation to simulate reality, creating the illusion of interacting with the physical world and thereby influencing consumer decision-making processes. Telepresence enhances interest and positive perceptions of destinations, leading to stronger intentions to visit (Ying *et al.*, 2022). Furthermore, it facilitates the assimilation of multi-dimensional information, enriching sensory experiences. However, excessive telepresence may lead to information overload, thereby diminishing consumer responsiveness (Cowan and Ketron, 2019).

The relationship between perceived authenticity and travel intentions has exhibited significant dynamics. Perceived authenticity positions virtual travel as a viable alternative for homebound activities, particularly during travel restrictions (Kim *et al.*, 2020). Moreover, the realism achieved in virtual tourism enhances perceptions of destinations (Ye *et al.*, 2020), prompting the progression from virtual to actual tourism. However, some research highlighted

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3 a nuanced link between authenticity and travel intentions, suggesting that in certain contexts,
4 such as virtual tours of historical sites, authenticity may provoke negative attitudes (Yeh *et al.*,
5 2024).
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9 As a crucial component of hedonic value, perceived attractiveness is considered pivotal
10 in shaping consumer's willingness to use a product or service (Molinillo *et al.*, 2020). From
11 one perspective, perceived attractiveness reflects reactions to destinations, encompassing both
12 emotional and cognitive dimensions. Consequently, when virtual tourism destinations offer
13 sufficient allure, tourists are more inclined to visit the corresponding physical destinations
14 (Ying *et al.*, 2022).
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19 In general, telepresence, perceived authenticity, and perceived attractiveness show a
20 stronger correlation with willingness to visit. This study aims to explore the role of
21 psychological perception and sensation in influencing the willingness to visit. Accordingly, the
22 following hypotheses were proposed:
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25 H₆: Telepresence positively affects the willingness to visit.

26 H₇: Authentic experiences positively affect the willingness to visit.

27 H₈: Perceived attractiveness positively affects the willingness to visit.
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32 **2.6 Moderating role of interaction type**

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34 Meta's Horizon Worlds allows users to create and share social VR experiences, facilitating
35 multi-user virtual travel interactions. Virtual social and interactive elements have become a
36 popular topic in virtual tourism research (Li and Wan, 2025; Zhu *et al.*, 2023). Virtual tourism
37 experiences feature interactive elements (Fan *et al.*, 2022). Some scholars are concerned about
38 the interaction between tourists and the virtual environment (Wu *et al.*, 2020). In addition to
39 the interaction between tourists and virtual environments, tourists desire social interactive
40 aspects, particularly interpersonal interactions (Zhang, *et al.*, 2022).
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46 Thus, this research divided virtual tourism interactions into two types: single-person and
47 multi-person. In single-person interactions, individuals interact with media, such as 3D virtual
48 environments and videos (Choi *et al.*, 2016), experiencing the media alone. In multi-person
49 interactions, individuals interact with other people (Wong *et al.*, 2023). Drawing on research
50 related to multiplayer gaming and participation in virtual tourism, the presence of others can
51 either interrupt or facilitate an individual's immersive experience (Cairns *et al.*, 2013; Hudson
52 *et al.*, 2019; Zhu *et al.*, 2023). It is anticipated that distinct types of social interactions will
53 impact visitor perceptions, ranging from vividness to telepresence. Enhancing social elements
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may amplify this process. On one hand, social features may induce “hyper-sociality”, reducing the psychological distance between individuals and the virtual environment. On the other hand, interpersonal engagement as a potent social factor, such as avatar-based communication, collaborative activities, and shared experiences, may intensify users’ perceived immersion and the dynamism of the virtual tourism space. Thus, the following hypothesis was proposed:

H₉: Interaction type moderates the impact of vividness on telepresence.

Based on the hypotheses above, the researchers developed the theoretical model for this study (Figure 1). The research model is anticipated to offer novel insights into the field of virtual tourism, particularly by comparing single- and multi-person interactions. The findings are expected to contribute to a deeper understanding of how media vividness influences telepresence, perceived attractiveness, and authentic experiences, and how these factors affect the willingness to visit virtual tourism sites.

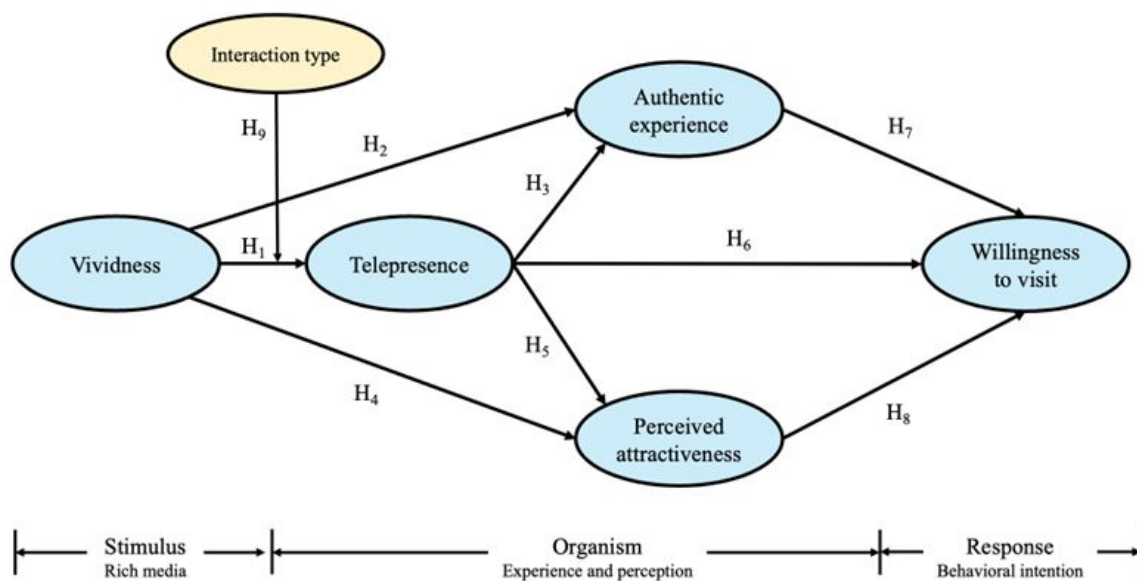


Figure 1. Hypothesized research model.

3 Methodology

3.1 Measurement

This research employed a quantitative design. A questionnaire consisting of 16 items across five constructs -- vividness, telepresence, authentic experiences, perceived attractiveness, and

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3 willingness to visit -- was used. Established scales were utilized to ensure reliable and valid
4 measurements. The vividness scale, comprising three items, was adapted from Kelley *et al.*
5 (1989) and Kim and Ko (2019). The telepresence scale, with four items, was from Choi *et al.*
6 (2016); the authentic experience scale, with three items, was sourced from Kim *et al.* (2020);
7 the perceived attractiveness scale, also with three items, was adapted from Molinillo *et al.*
8 (2020); and the willingness to visit scale, with three items, was adapted from Sharma *et al.*
9 (2022) and Lam and Hsu (2006). The questionnaire was translated into Chinese, and peer
10 experts were invited to professionally evaluate the scales. The back-translation method was
11 employed, ensuring the required precision rate (Edunov *et al.*, 2018). All items were measured
12 on a seven-point Likert scale, ranging from (1) strongly disagree to (7) strongly agree, due to
13 its high reliability and discriminant validity. Additionally, socio-demographic questions were
14 included to gather information on respondents (e.g., gender, age, education, and monthly
15 income).

26 **3.2 Data collection and procedure**

27 A survey tool was used to collect data in April 2022 via www.wjx.cn, one of the largest online
28 survey platforms in China. The questionnaires were distributed and completed on social media
29 platforms, including WeChat, Weibo, and Douban, and were also shared in VR online groups.
30 The initial question in the form asked whether participants had previously experienced virtual
31 tours, and only those who had were selected for the study. Participants were then randomly
32 divided into two equal groups: one group viewed a single-person interaction video, and the
33 other watched a multi-person interaction video before completing the questionnaire.

34 Drawing on the research of Sharma *et al.* (2022), the interaction videos used were from
35 the game Grand Theft Auto V (GTA 5). In this game, “Los Santos” is a virtual city modeled
36 on Los Angeles, allowing players to experience the city as a virtual perspective. The
37 researchers recorded 60-second videos from this game, simulating either a single-player or
38 multi-player scenario (as shown in Figures 2 and 3). Both videos included a virtual roller
39 coaster ride, with the multi-person video also featuring a communication scene with other
40 players after the ride.

41 At the beginning of the questionnaire, participants were informed about the concepts of
42 “virtual tourism,” “single-person interaction,” and “multi-person interaction.” Before viewing
43 the stimulus material, an example of a 360° panoramic virtual tour of the Forbidden City was
44 shown to help them better understand the concept of “virtual tourism” as used in this research
45 (as shown in Figure 4). In the formal test, a dwell time was set for each page, allowing
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participants to proceed to the next page only after viewing the stimulus material. Participants were required to complete a questionnaire after watching the video. To ensure the validity of the responses, questionnaires completed in less than 180 seconds were considered invalid.



Figure 2. Single-person interaction



Figure 3. Multi-person interaction

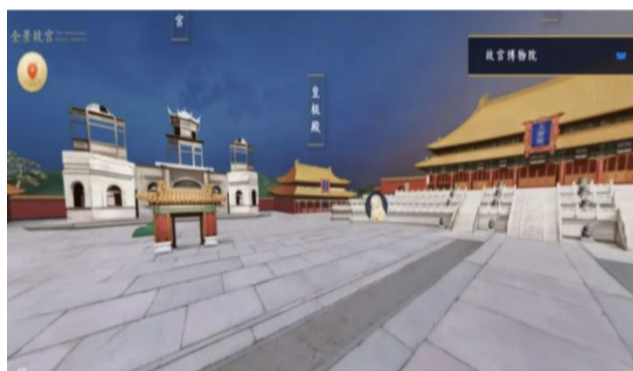


Figure 4. 360° panoramic virtual tour of the Forbidden City

3.3 Data analysis

In this research, the data analysis techniques and process were as follows. Initially, SPSS 26.0 was used to analyze the demographic characteristics of the sample. Next, common method variance was examined. Subsequently, partial least squares structural equation modeling (PLS-SEM) was employed to assess the measurement and structural models using SmartPLS 4.0.9.2 software. The moderating role of interaction type was tested through multi-group difference analysis (MGA). Compared to covariance-based structural equation modeling (CB-SEM), PLS-SEM is particularly appropriate for models with numerous constructs and small sample sizes (Hair *et al.*, 2021), making it well-suited for this research.

4 Results

4.1 Respondent profiles

SPSS 26.0 was used to perform descriptive statistical analysis on the sample. Table 1 presents the demographic characteristics of the participants. A total of 579 individuals participated in this research. In the single-person interaction group, 279 participants were recruited, with approximately 43.4% male and 56.6% female. In the multi-person interaction group, 279 participants were also recruited, with approximately 49.5% male and 50.5% female. Both groups exhibited similar demographic characteristics in terms of education and monthly income.

Table 1. Demographic profile of respondents.

	Demographic variables	Single-person interaction	Multi-person interaction
Gender	Male	121	138
	Female	158	141
Age	Under 24	156	135
	24 - 34	103	110
	35 - 44	14	19
	45 - 54	3	7
	55 and above	3	8
Education	Less than high school	4	11
	High school graduate	4	7
	Junior college	24	22
	Technical secondary school	6	15
	Bachelor's degree	176	173
	Master's degree and above	65	51
Monthly income	¥2000 or below	107	83
	¥2001- 5000	72	85
	¥5001- 8000	54	66
	¥8001- 10000	22	37
	¥10001 or above	24	8

4.2 Common method variance

The issue of common method variance in the sample of the two groups was first assessed. Harman's one-factor test was conducted using SPSS 26.0 to examine this issue. The results showed that the variance contribution of the first factor in both groups was less than 50%,

indicating that common method bias was not a significant problem in this research (Podsakoff *et al.*, 2003).

4.3 Measurement model analysis

Following the steps suggested by Hair *et al.* (2019), factor loadings were examined, and the results showed that all loadings in both models were above 0.708, providing acceptable item reliability. Additionally, as presented in Table 2, the composite reliability (CR) and Cronbach's Alpha values were higher than 0.7, indicating that the reliability of the constructs met the required standards. Convergent validity was then evaluated by calculating the average variance extracted (AVE) values. The results indicated that all AVE values were greater than 0.5, confirming acceptable convergent validity for each construct (Hair *et al.*, 2021).

Table 2. Validity and reliability of constructs.

Constructs and measurement items	Single-person				Multi-person			
	Loading	AVE	CR	Alpha	Loading	AVE	CR	Alpha
Vividness		0.759	0.904	0.841		0.730	0.890	0.815
The imagery provided by the media was highly vivid.	0.864				0.862			
The information provided by the media was rich.	0.847				0.827			
The contents provided by the media were detailed.	0.901				0.873			
Telepresence		0.641	0.877	0.813		0.706	0.906	0.861
It looked as real to me as the real world.	0.805				0.878			
I felt that I was at the destination.	0.768				0.790			
I could remember vividly.	0.831				0.843			
I had a clear memory.	0.798				0.849			
Authentic experience		0.714	0.882	0.800		0.703	0.876	0.788
Virtual tourism provided me with authentic experiences.	0.849				0.885			
Virtual tourism provided me with unique experiences.	0.807				0.760			
Virtual tourism provided me with exceptional experiences.	0.877				0.865			
Perceived attractiveness		0.671	0.859	0.755		0.728	0.889	0.814
The visual appeal of virtual tourism attracts me.	0.849				0.880			
The realistic appeal of virtual tourism attracts me.	0.838				0.856			
The acoustic appeal of virtual tourism attracts me.	0.768				0.823			
Willingness to visit		0.748	0.899	0.832		0.693	0.871	0.778
I would like to visit this place in the future.	0.865				0.825			
I intend to visit this place soon.	0.845				0.802			
I will likely visit this place in the future.	0.884				0.868			

The discriminant validity of the constructs was examined using two approaches. First, the Fornell and Larcker (1981) criterion was applied. The values on the diagonal (square root of AVEs) were higher than the respective correlation coefficients, indicating acceptable discriminant validity for the single- and multi-person interaction models (Table 3).

Additionally, the HTMT (Heterotrait-Monotrait) approach was employed. The results showed that the HTMT values were below 0.9, confirming acceptable discriminant validity (Hair *et al.*, 2021).

Table 3. Discriminant validity (Fornell and Larcker).

Single-person	Authentic experience	Perceived attractiveness	Telepresence	Vividness	Willingness to visit
Authentic experience	<i>0.845</i>				
Perceived attractiveness	0.707	<i>0.819</i>			
Telepresence	0.648	0.589	<i>0.801</i>		
Vividness	0.578	0.522	0.556	<i>0.871</i>	
Willingness to visit	0.608	0.534	0.488	0.512	<i>0.865</i>
Multi-person	Authentic experience	Perceived attractiveness	Telepresence	Vividness	Willingness to visit
Authentic experience	<i>0.838</i>				
Perceived attractiveness	0.736	<i>0.853</i>			
Telepresence	0.750	0.688	<i>0.841</i>		
Vividness	0.648	0.631	0.693	<i>0.854</i>	
Willingness to visit	0.633	0.640	0.606	0.530	<i>0.832</i>

Note: Italic numbers on the diagonal indicate the square root of AVE.

4.4 Structural model analysis

Several steps were followed to examine the structural model in PLS-SEM. First, this research assessed the structural model for collinearity. All items were tested for variance inflation factor (VIF) values, with the results indicating that the VIF values for both groups were below 3, suggesting that collinearity was not a concern in this research (Hair *et al.*, 2021). Next, the R^2 values of the endogenous constructs were provided to better estimate the explanatory power. As shown in Table 4, the R^2 values in the multi-person group ranged from 0.480 to 0.594, and the R^2 values in the single-person group ranged from 0.310 to 0.488, all of which were higher than 0.13 (Cohen, 1988). The results indicated that the explanatory power of the two models was moderate (Hair *et al.*, 2011; Henseler *et al.*, 2009).

In addition, f^2 effect sizes were calculated to assess the strength of the relationship between the latent variables. As suggested by Cohen (1988), values higher than 0.02, 0.15, and 0.35 indicate small, medium, and large f^2 effect sizes, respectively. For the multi-person interaction group, the results revealed that the f^2 effect sizes ranged from 0.022 (small) for the effect of telepresence on willingness to visit to 0.640 (large) for the effect of vividness on telepresence. For the single-person interaction group, the f^2 effect sizes ranged from 0.014 (negligible) for the effect of telepresence on willingness to visit to 0.448 (large) for the effect of vividness on

telepresence. In this research, Q^2 values were used to measure predictive relevance by accessing the model's ability to predict endogenous latent variables (Hair *et al.*, 2021). As shown in Table 4, the Q^2 values for the endogenous constructs in both groups were above 0, indicating that the PLS path models had predictive accuracy (Hair *et al.*, 2019).

Table 4. Explanatory power

Predictor (s)	Outcome (s)	Multi-person				Single-person			
		R ²	Q ²	f ²	Effect size	R ²	Q ²	f ²	Effect size
Vividness	Telepresence	0.480	0.475	0.640	Large	0.310	0.302	0.448	Large
Vividness	Authentic experience	0.594	0.413	0.110	Small	0.488	0.327	0.134	Small
Telepresence				0.363	Large			0.301	Medium
Vividness	Perceived attractiveness	0.519	0.393	0.092	Small	0.401	0.262	0.091	Small
Telepresence				0.255	Medium			0.216	Medium
Telepresence	Willingness to visit	0.483	0.275	0.022	Small	0.400	0.244	0.014	Negligible
Authentic experience				0.071	Small			0.113	Small
Perceived attractiveness				0.049	Small			0.024	Small

The direct effects of the multi- and single-person interaction paths are presented in Figure 5 and Table 5. Comparing the two models, all hypotheses in the multi-person interaction model were supported; however, H_6 in the single-person interaction model was not supported. For the multi-person group, the results indicated a positive and significant impact of vividness on telepresence ($H_1, \beta = 0.693, t = 16.790, p < 0.000$), vividness on authentic experience ($H_2, \beta = 0.246, t = 4.335, p < 0.000$), telepresence on authentic experience ($H_3, \beta = 0.579, t = 9.676, p < 0.000$), vividness on perceived attractiveness ($H_4, \beta = 0.297, t = 3.433, p < 0.001$), telepresence on perceived attractiveness ($H_5, \beta = 0.482, t = 5.853, p < 0.000$), telepresence on willingness to visit ($H_6, \beta = 0.200, t = 2.733, p < 0.006$), authentic experience on willingness to visit ($H_7, \beta = 0.246, t = 2.950, p < 0.003$), and perceived attractiveness on willingness to visit ($H_8, \beta = 0.322, t = 3.976, p < 0.000$). For the single-person group, the results indicated a positive and significant impact of vividness on telepresence ($H_1, \beta = 0.556, t = 10.749, p < 0.000$), vividness on authentic experience ($H_2, \beta = 0.315, t = 4.600, p < 0.000$), telepresence on authentic experience ($H_3, \beta = 0.473, t = 6.894, p < 0.000$), vividness on perceived attractiveness ($H_4, \beta = 0.281, t = 3.358, p < 0.001$), telepresence on perceived attractiveness ($H_5, \beta = 0.432, t = 5.284, p < 0.000$), authentic experience on willingness to visit ($H_7, \beta = 0.403, t = 4.618, p < 0.000$), and perceived attractiveness on willingness to visit ($H_8, \beta = 0.176, t = 2.055, p < 0.040$).

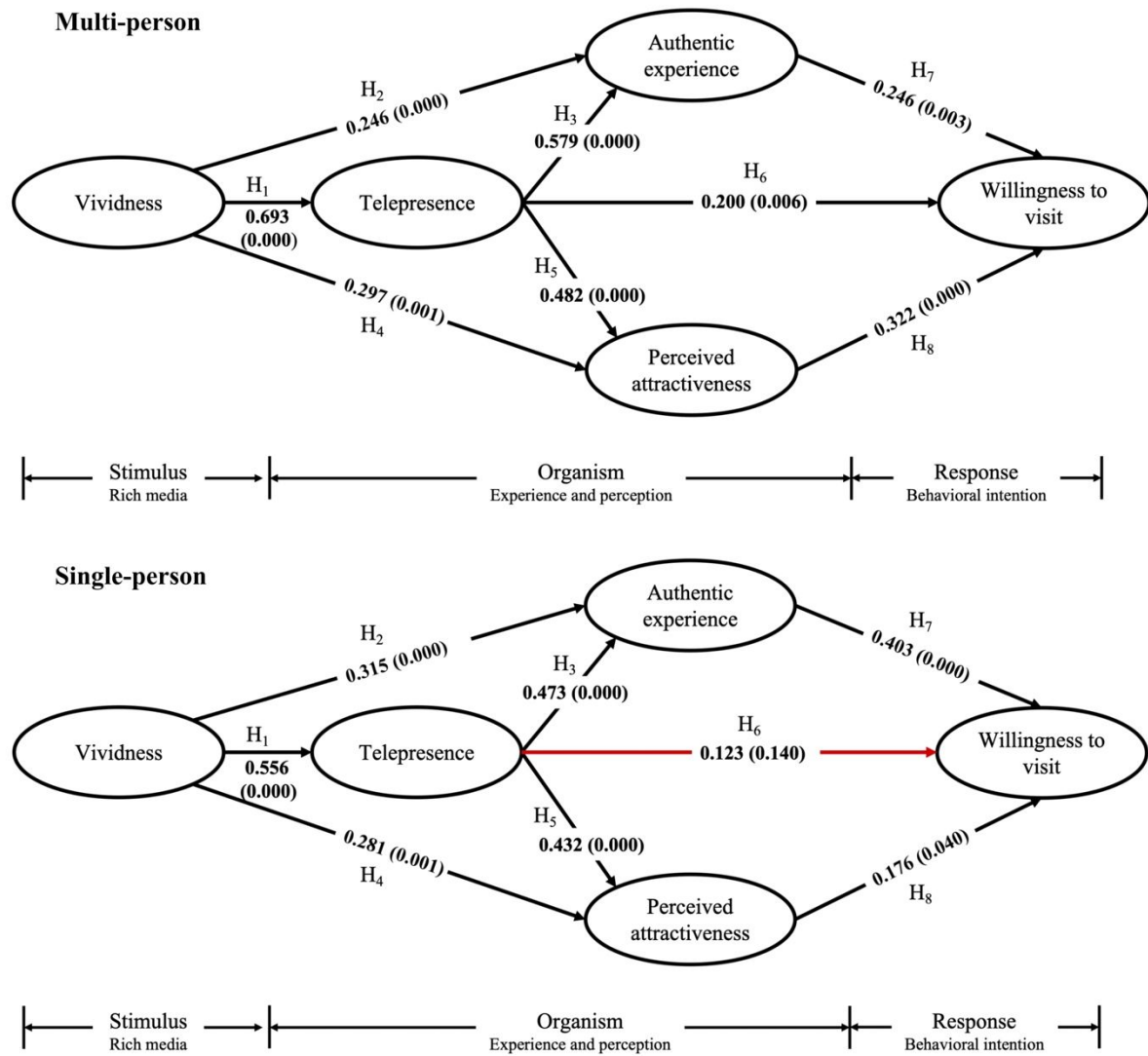


Figure 5. Path coefficients for multi- and single-person interaction models.

Table 5. Direct effects of multi-person and single-person interaction model.

Hypothesis	Path	Multi-person			Single-person		
		β	P-value	Result	β	P-value	Result
H ₁	Vividness → Telepresence	0.693	0.000 ***	Supported	0.556	0.000 ***	Supported
H ₂	Vividness → Authentic experience	0.246	0.000 ***	Supported	0.315	0.000 ***	Supported
H ₃	Telepresence → Authentic experience	0.579	0.000 ***	Supported	0.473	0.000 ***	Supported
H ₄	Vividness → Perceived attractiveness	0.297	0.001 **	Supported	0.281	0.001 **	Supported
H ₅	Telepresence → Perceived attractiveness	0.482	0.000 ***	Supported	0.432	0.000 ***	Supported
H ₆	Telepresence → Willingness to visit	0.200	0.006 **	Supported	0.123	0.140	Not supported
H ₇	Authentic experience → Willingness to visit	0.246	0.003 **	Supported	0.403	0.000 ***	Supported

H ₈	Perceived attractiveness -> Willingness to visit	0.322	0.000 ***	Supported	0.176	0.040 *	Supported
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Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 6 presents the indirect effects of the multi-person and single-person interaction models. All indirect effects in the multi-person interaction model were significant. However, in the single-person interaction model, the paths from vividness to willingness to visit via telepresence and perceived attractiveness were not significant. This indicates that in the single-person interactive virtual tourism experience, vividness did not positively influence willingness to visit through its effects on telepresence and perceived attractiveness.

Table 6. Indirect effects of multi- and single-person interaction models.

Path	<i>p-value</i>		<i>Sig.</i>	
	Multi-person	Single-person	Multi-person	Single-person
Vividness -> Telepresence -> Authentic experience	0.000 ***	0.000 ***	YES	YES
Vividness -> Telepresence -> Perceived attractiveness	0.000 ***	0.000 ***	YES	YES
Vividness -> Telepresence -> Willingness to visit	0.007 **	0.161	YES	NO
Vividness -> Authentic experience -> Willingness to visit	0.021 *	0.005 **	YES	YES
Vividness -> Perceived attractiveness -> Willingness to visit	0.010 *	0.145	YES	NO
Vividness -> Telepresence -> Authentic experience -> Willingness to visit	0.005 **	0.000 ***	YES	YES
Vividness -> Telepresence -> Perceived attractiveness -> Willingness to visit	0.001 **	0.037 *	YES	YES
Telepresence -> Authentic experience -> Willingness to visit	0.004 **	0.000 ***	YES	YES

Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$

4.5 Moderating effect of interaction type

Since interaction type was a categorical variable, Bootstrap multi-group SEM analysis was used to verify its moderating effect. Results with non-significant moderating effects were excluded (Table 7). The interaction type was found to significantly moderate the path from vividness to telepresence in all paths, thus supporting H₉. The negative numbers implied a stronger moderating effect in the multi-person group for the same path, whereas positive numbers indicated a stronger effect in the single-person group. Moreover, the effect of vividness on telepresence was stronger in multi-person interactions compared to single-person interaction environments.

Table 7. Moderating effects of single- and multi-person interaction models.

Path	Difference (single-person - multi-person)	<i>p</i> -value
Vividness -> Telepresence	-0.136	0.038 *
Authentic experience -> Willingness to visit	0.157	0.198
Perceived attractiveness -> Willingness to visit	-0.145	0.223
Telepresence -> Authentic experience	-0.106	0.245
Telepresence -> Perceived attractiveness	-0.051	0.667
Telepresence -> Willingness to visit	-0.077	0.482
Vividness -> Authentic experience	0.068	0.443
Vividness -> Perceived attractiveness	-0.015	0.898

Note: * = $p < 0.05$

5 Conclusions and discussion

Based on the S-O-R framework and MRT, this research developed a model to describe how media vividness (stimulus) impacted willingness to visit by examining the relationships among telepresence, authentic experiences, and perceived attractiveness in virtual tourism. More importantly, the differences between single-person and multi-person interactions were examined. The following were the main conclusions.

First, this comparative study of social interaction attributes deepens the understanding of interactive virtual tourism. The results align with previous research, demonstrating that the vividness and interactivity of virtual tourism increases travel intentions (Cheng and Huang, 2022; Leung *et al.*, 2022; Wu *et al.*, 2021; Zhu *et al.*, 2024b). Unlike previous studies, this research focuses on interactions and observes the differences between single- and multi-person interactions. The results indicate that the vividness perceived by the multi-person interaction group was stronger than that perceived by the single-person interaction group. Additionally, vividness had a more substantial effect on telepresence in multi-person interactions. Consequently, telepresence was more likely to create a positive, authentic experience and greater perceived attractiveness and visit intentions in multi-person interactions than in single-person interactions. Previous studies on multiplayer games have also demonstrated the positive effects of socialization, indicating that being with others seems to increase immersion (Cairns *et al.*, 2013). Furthermore, it was found that increasing social presence indirectly encouraged intentions to engage in virtual travel, confirming and extending previous findings (Nagy and Koles, 2014).

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Second, telepresence and perceived attractiveness did not significantly influence the willingness to visit in the single-person interaction group. This finding is supported by previous research, which indicates that people have social needs in virtual spaces (Algharabat et al., 2018). Interaction between people increases communication and involvement, thereby supporting positive travel intentions (Dai *et al.*, 2022). Unconsciously, people may be influenced by the emotions of others, promoting more positive behavioral intentions related to the destination (Marques *et al.*, 2021). Conversely, the willingness to visit in the single-person group may be affected by perceptions of isolation (Merkx and Nawijn, 2021). Thus, in addition to interactions between individuals and virtual environments, human-human interaction is gradually becoming central to the experience economy (Babin and James, 2010). This supports the argument that experience integrates things, the environment, and people (Belk, 1988).

Third, while the social element cannot be ignored, the results for the single-person group were interesting. The moderating effect of single-person interaction was stronger on the paths from vividness to authentic experience, and from authentic experience to the willingness to visit. This suggests that vividness triggers a stronger willingness to visit through authentic experience under the premise of single-person interaction. This may be due to tourists' preference for solitary travel experiences or their personalities (Santana-Jiménez *et al.*, 2015). As social animals, human beings have certain social needs, but experiences of ostracism may reduce the sense of belonging and social needs in virtual space. Studies of the metaverse have confirmed this (Kim *et al.*, 2024). Moreover, social interaction may bring visitors back to the everyday life of social relationships. Because telepresence is a feeling of being present in a mediated environment, social interaction may dampen this feeling (Hudson *et al.*, 2019).

6 Theoretical implications

First, based on the S-O-R framework and MRT, this study proposed and tested a theoretical model of virtual tourism. The model integrates media vividness, telepresence, authentic experiences, perceived attractiveness, and willingness to visit in virtual tourism. While most previous studies have discussed the antecedents and consequences of user experience (Wu *et al.*, 2021), this study complements these by examining the relationships among virtual tourism attributes such as vividness, authenticity, and attractiveness (Cheng and Huang, 2022; Leung *et al.*, 2022; Li and Wan, 2025; Zhu *et al.*, 2023; Zhu *et al.*, 2024b). These findings fill a gap by considering social interactions and comparing differences between single- and multi-person interactions. This work clarifies that in interactive virtual tourism, vividness is more likely to

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3 induce presence, while single-person virtual tourism does not. As a result, there is a better
4 understanding of how social elements and vivid design increase the willingness to participate
5 in virtual tourism.
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10 Second, this research integrated the MRT and S-O-R frameworks to expand the research
11 of these two theories in tourism. Previous scholars have used these two theories to study travel
12 apps (Wu *et al.*, 2020). By considering rich media as a stimulus, this investigation expanded
13 the application of MRT to research on virtual tourism experiences. Unlike earlier studies that
14 combined interactivity and vividness to explore the causes and consequences of virtual tourism
15 (Wu *et al.*, 2021), this study separated interactivity and vividness. This was due to the
16 generalized context of virtual tourism in this research, which was not limited to virtual reality
17 (Wong *et al.*, 2022). Previous research has shown that web-based virtual tourism is more vivid
18 (Cheng *et al.*, 2014; Van Kerrebroeck *et al.*, 2017), allowing the theory to be applied more
19 precisely to different virtual tourism scenarios.
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27 Third, this analysis identified a new application for MRT within interactive virtual tourism
28 scenarios. Previous research has primarily focused on the impact of media on consumers in
29 contexts such as e-commerce and mobile advertising (Tseng and Wei, 2020; Yim *et al.*, 2017).
30 This comparative study highlights the importance of examining how interaction type (single-
31 person vs. multi-person) influences the relationships between key variables in virtual tourism
32 experiences. The findings suggest that the cognitive and emotional processes underlying virtual
33 tourism experiences differ between individual and shared contexts. Researchers should further
34 explore the unique dynamics of these interaction modes, providing new perspectives on
35 interaction differences in virtual experiences. Human-environment interaction, i.e., single-
36 person interaction, differs from social interaction in the virtual tourism experience.
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43 **7 Practical implications**

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45 There are three practical implications that stakeholders related to virtual tourism should
46 consider. First, virtual tourism providers should design experiences that optimize participation
47 for both solo and shared interaction modes, catering to diverse consumer preferences and use
48 cases. Destination management organizations (DMOs) should prepare for varying interaction
49 type preferences post-product launch and introduce targeted tourism offers. If tourists prefer
50 single-person interactions, the tour website can be continuously optimized, and a single-person
51 template should be created for the virtual tourism product. If people prefer more interactive
52 virtual tour experiences, then VR tourism or even the metaverse can be launched to emphasize
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3 multi-person social interaction functions, further enhancing travel mental simulation and
4 destination attractiveness.
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7 Second, for destination marketers, the social element is an influential and easily
8 manipulated factor (Li and Wan, 2025). The findings indicate that enhancing media vividness
9 is particularly important for fostering a sense of telepresence and subsequent outcomes in
10 multi-person virtual tourism. For multi-person virtual tourism experiences, DMOs should
11 adopt strategies such as designing virtual environments with interactive experiences, including
12 avatar customization, voice chat, and collaborative tasks. Vividness should be leveraged for
13 superior telepresence. For single-person virtual tourism, destination marketers should optimize
14 authentic experiences to create a stronger sense of authenticity, incorporating historically
15 accurate details, local cultural elements, and immersive narratives (Li *et al.*, 2024a).
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23 Third, interactive virtual tours can also be integrated into educational and cultural
24 itineraries. Multi-person virtual travel helps provide personal and shared virtual travel
25 experiences, which may be more effectively realized in the metaverse (Zhao *et al.*, 2022).
26 Cross-cultural communication through multi-person interaction in virtual spaces allows groups
27 from diverse backgrounds to break down geographical and cultural barriers and explore
28 destinations together. Additionally, multi-person virtual travel experiences can be integrated
29 into education, providing immersive learning opportunities for people of all ages. This
30 application may help children interact with virtual environments and virtual people to enhance
31 their cultural interests (Li *et al.*, 2024a).
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38 **8 Limitations and future research directions**

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40 This research has some limitations. First, due to the limited sample size and scope of data
41 collection, only the moderating effect of interaction type was tested. Future studies should
42 examine additional variables, such as age and educational levels, to provide a more
43 comprehensive understanding. For instance, younger generations may perceive virtual tourism
44 differently compared to older generations, highlighting the need to investigate and compare the
45 perspectives of Generation Z and Generation Y.
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51 Additionally, this research utilized 360° online video games as the virtual tourism
52 environment, which only allows for a preliminary examination of the impact of interaction on
53 travel intentions. Future research will benefit from incorporating advanced VR devices, such
54 as the Apple Vision Pro, which offer a more immersive sensory and interactive experience for
55 potential international tourists exploring various destinations.
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Moreover, researchers are advised to compare and analyze virtual tourism experiences in both broad and narrow contexts to gain deeper insights into their effects. These avenues for future research could provide valuable contributions to the field by addressing the current study's limitations and expanding the understanding of virtual tourism's potential.

References

- Algharabat, R., Rana, N.P., Dwivedi, Y.K., Alalwan, A.A. and Qasem, Z. (2018), "The effect of telepresence, social presence and involvement on consumer brand engagement: An empirical study of non-profit organizations", *Journal of Retailing and Consumer Services*, Vol. 40, pp. 139–149.
- Babin, B.J. and James, K.W. (2010), "A brief retrospective and introspective on value", *European Business Review*, Vol. 22 No. 5, pp. 471–478.
- Baek, E., Choo, H.J., Wei, X. and Yoon, S.-Y. (2020), "Understanding the virtual tours of retail stores: how can store brand experience promote visit intentions?", *International Journal of Retail & Distribution Management*, Vol. 48 No. 7, pp. 649–666.
- Beck, J., Rainoldi, M. and Egger, R. (2019), "Virtual reality in tourism: a state-of-the-art review", *Tourism Review*, Vol. 74 No. 3, pp. 586–612.
- Belk, R.W. (1988), "Possessions and the extended self", *Journal of Consumer Research*, Vol. 15 No. 2, pp. 139–168.
- Cairns, P., Cox, A.L., Day, M., Martin, H. and Perryman, T. (2013), "Who but not where: The effect of social play on immersion in digital games", *International Journal of Human-Computer Studies*, Vol. 71 No. 11, pp. 1069–1077.
- Calisto, M. de L. and Sarkar, S. (2024), "A systematic review of virtual reality in tourism and hospitality: The known and the paths to follow", *International Journal of Hospitality Management*, Vol. 116, p. 103623.
- Cheng, L.-K., Chieng, M.-H. and Chieng, W.-H. (2014), "Measuring virtual experience in a three-dimensional virtual reality interactive simulator environment: A structural equation modeling approach", *Virtual Reality*, Vol. 18 No. 3, pp. 173–188.
- Cheng, L. K., and Huang, H. L. (2022). "Virtual tourism atmospheres: The effects of pleasure, arousal, and dominance on the acceptance of virtual tourism". *Journal of Hospitality and Tourism Management*, Vol. 53, pp. 143-152.

- 1
2
3 Choi, J., Ok, C. and Choi, S. (2016), “Outcomes of destination marketing organization website
4 navigation: The role of telepresence”, *Journal of Travel & Tourism Marketing*, Vol. 33
5 No. 1, pp. 46–62.
6
7
8 Choi, Y., Hickerson, B. and Lee, J. (2018), “Investigation of the technology effects of online
9 travel media on virtual travel experience and behavioral intention”, *Journal of Travel &
10 Tourism Marketing*, Vol. 35 No. 3, pp. 320–335.
11
12
13 Cohen, J. (1988), *Statistical power analysis for the behavioral sciences* (2nd ed.), New York,
14 Routledge.
15
16
17 Cowan, K., and Ketron, S. (2019). “A dual model of product involvement for effective virtual
18 reality: The roles of imagination, co-creation, telepresence, and interactivity”, *Journal of
19 Business Research*, Vol. 100, pp. 483-492.
20
21
22 Dai, F., Wang, D. and Kirillova, K. (2022), “Travel inspiration in tourist decision making”,
23 *Tourism Management*, Vol. 90, p. 104484.
24
25
26 Dubois, L.-E. and Gibbs, C. (2018), “Video game–induced tourism: a new frontier for
27 destination marketers”, *Tourism Review*, Vol. 73 No. 2, pp. 186–198.
28
29
30 Edunov, S., Ott, M., Auli, M. and Grangier, D. (2018), “Understanding Back-Translation at
31 Scale”, in Riloff, E., Chiang, D., Hockenmaier, J. and Tsujii, J. (Eds.), *EMNLP 2018:
32 Proceedings of the 2018 Conference on Empirical Methods in Natural Language
33 Processing*, Association for Computational Linguistics, Brussels, Belgium, pp. 489–500.
34
35
36 El-Said, O. and Aziz, H. (2022), “Virtual tours a means to an end: An analysis of virtual tours’
37 role in tourism recovery post COVID-19”, *Journal of Travel Research*, Vol. 61 No. 3, pp.
38 528–548.
39
40
41 Fan, X., Jiang, X. and Deng, N. (2022), “Immersive technology: A meta-analysis of
42 augmented/virtual reality applications and their impact on tourism experience”, *Tourism
43 Management*, Vol. 91, p. 104534.
44
45
46 Fornell, C. and Larcker, D.F. (1981), “Structural equation models with unobservable variables
47 and measurement error: Algebra and statistics”, *Journal of Marketing Research*, Vol. 18
48 No. 3, pp. 382-388.
49
50
51 Fortin, D.R. and Dholakia, R.R. (2005), “Interactivity and vividness effects on social presence
52 and involvement with a web-based advertisement”, *Special Section: Marketing
53 Communications and Consumer Behavior*, Vol. 58 No. 3, pp. 387–396.
54
55
56
57
58
59
60

- 1
2
3 Gao, B.W., Zhu, C., Song, H. and Dempsey, I.M.B. (2022), “Interpreting the perceptions of
4 authenticity in virtual reality tourism through postmodernist approach”, *Information*
5 *Technology & Tourism*, Vol. 24 No. 1, pp. 31–55.
6
7
8 Ghorbanzadeh, D. (2022), “Relationships Between Virtual Reality Experiences, Experiential
9 Relationship Quality and Experiential Advocacy: The Case of Virtual Reality Park”,
10 *Journal of Relationship Marketing*, Vol. 21 No. 3, pp. 169–193.
11
12 Grewal, R., Gupta, S. and Hamilton, R. (2021), “Marketing insights from multimedia data:
13 Text, image, audio, and video”, *Journal of Marketing Research*, Vol. 58 No. 6, pp. 1025–
14 1033.
15
16
17
18 Gutiérrez, M.A.A., Vexo, F. and Thalmann, D. (2008), *Stepping into virtual reality*, Springer,
19 London.
20
21
22 Guttentag, D.A. (2010), “Virtual reality: Applications and implications for tourism”, *Tourism*
23 *Management*, Vol. 31 No. 5, pp. 637–651.
24
25
26 Hair, J.F., Black, W. C., Babin, B. J., and Anderson, R. E. (2009), *Multivariate data analysis*,
27 7th edition., Pearson.
28
29 Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2021), *A Primer on Partial Least*
30 *Squares Structural Equation Modeling (PLS-SEM)*, SAGE Publications.
31
32 Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), “PLS-SEM: Indeed a silver bullet”, *Journal*
33 *of Marketing Theory and Practice*, Vol. 19 No. 2, pp. 139–152.
34
35
36 Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M. (2019), “When to use and how to report
37 the results of PLS-SEM”, *European Business Review*, Vol. 31 No. 1, pp. 2–24.
38
39
40 Henseler, J., Ringle, C.M. and Sinkovics, R.R. (2009), The use of partial least squares path
41 modeling in international marketing, Sinkovics, R.R. and Ghauri, P.N. (Ed.), *New*
42 *Challenges to International Marketing*, Leeds, Emerald Group Publishing Limited, pp.
43 277–319.
44
45
46 Huang, L.-T. (2016), “Flow and social capital theory in online impulse buying”, *Journal of*
47 *Business Research*, Vol. 69 No. 6, pp. 2277–2283.
48
49
50 Huang, Y.C., Backman, K.F., Backman, S.J. and Chang, L.L. (2016), “Exploring the
51 implications of virtual reality technology in tourism marketing: An integrated research
52 framework”, *International Journal of Tourism Research*, Vol. 18 No. 2, pp. 116–128.
53
54
55 Hudson, S., Matson-Barkat, S., Pallamin, N. and Jegou, G. (2019), “With or without you?
56 Interaction and immersion in a virtual reality experience”, *Journal of Business Research*,
57 Vol. 100, pp. 459–468.
58
59
60

- 1
2
3 Hyun, M.Y., Lee, S. and Hu, C. (2009), "Mobile-mediated virtual experience in tourism:
4 Concept, typology and applications", *Journal of Vacation Marketing*, Vol. 15 No. 2, pp.
5 149–164.
6
7
8
9 Ishii, K., Lyons, M. and Carr, S. (2019), "Revisiting media richness theory for today and
10 future", *Human Behavior and Emerging Technologies*, Vol. 1 No. 2, pp. 124–131.
11
12 Jacoby, J. (2002), "Stimulus-organism-response reconsidered: an evolutionary step in
13 modeling (consumer) behavior", *Journal of Consumer Psychology*, Vol. 12 No. 1, pp. 51–
14 57.
15
16
17 Kelley, C.A., Gaidis, W.C. and Reingen, P.H. (1989), "The use of vivid stimuli to enhance
18 comprehension of the content of product warning messages", *Journal of Consumer*
19 *Affairs*, Vol. 23 No. 2, pp. 243–266.
20
21
22 Kim, D. and Ko, Y.J. (2019), "The impact of virtual reality (VR) technology on sport
23 spectators' flow experience and satisfaction", *Computers in Human Behavior*, Vol. 93,
24 pp. 346–356.
25
26
27 Kim, M.J., Lee, C.-K. and Preis, M.W. (2020), "The impact of innovation and gratification on
28 authentic experience, subjective well-being, and behavioral intention in tourism virtual
29 reality: The moderating role of technology readiness", *Telematics and Informatics*, Vol.
30 49, p. 101349.
31
32
33
34 Kim, T., Jin, H., Hwang, J., Kim, N., Im, J., Jeon, Y., and Sung, Y. (2024). "Being excluded
35 in the metaverse: Impact of social ostracism on users' psychological responses and
36 behaviors", *International Journal of Information Management*, Vol. 78, p. 102808.
37
38
39 Klein, L.R. (2003), "Creating virtual product experiences: The role of telepresence", *Journal*
40 *of Interactive Marketing*, Vol. 17 No. 1, pp. 41–55.
41
42
43 Kolar, T. and Zabkar, V. (2010), "A consumer-based model of authenticity: An oxymoron or
44 the foundation of cultural heritage marketing?", *Tourism Management*, Vol. 31 No. 5, pp.
45 652–664.
46
47
48 Lam, T. and Hsu, C.H. (2006), "Predicting behavioral intention of choosing a travel
49 destination", *Tourism Management*, Vol. 27 No. 4, pp. 589–599.
50
51
52 Lee, Y., Kozar, K.A. and Larsen, K.R. (2009), "Avatar e-mail versus traditional e-mail:
53 Perceptual difference and media selection difference", *Decision Support Systems*, Vol. 46
54 No. 2, pp. 451–467.
55
56
57 Leung, W.K.S., Cheung, M.L., Chang, M.K., Shi, S., Tse, S.Y. and Yusrini, L. (2022), "The
58 role of virtual reality interactivity in building tourists' memorable experiences and post-
59
60

- 1
2
3 adoption intentions in the COVID-19 era”, *Journal of Hospitality and Tourism*
4 *Technology*, Vol. 13 No. 3, pp. 481–499.
- 5
6 Li, H., Daugherty, T. and Biocca, F. (2002), “Impact of 3-D advertising on product knowledge,
7 brand attitude, and purchase intention: The mediating role of presence”, *Journal of*
8 *Advertising*, Vol. 31 No. 3, pp. 43–57.
- 9
10
11 Li, M., Sun, X., Zhu, Y., and Qiu, H. (2024a). “Real in virtual: the influence mechanism of
12 virtual reality on tourists’ perceptions of presence and authenticity in museum tourism”,
13 *International Journal of Contemporary Hospitality Management*.
14 <https://doi.org/10.1108/IJCHM-07-2023-0957>
- 15
16
17 Li, N., Li, L., Chen, X. and Wong, I.A. (2024b), “Digital destination storytelling: Narrative
18 persuasion effects induced by story satisfaction in a VR context”, *Journal of Hospitality*
19 *and Tourism Management*, Vol. 58, pp. 184–196.
- 20
21
22 Li, Y. and Peng, Y. (2021), “What drives gift-giving intention in live streaming? The
23 perspectives of emotional attachment and flow experience”, *International Journal of*
24 *Human–Computer Interaction*, Vol. 37 No. 14, pp. 1317–1329.
- 25
26
27 Li, Y. (William) and Wan, L.C. (2025), “Inspiring tourists’ imagination: How and when human
28 presence in photographs enhances travel mental simulation and destination
29 attractiveness”, *Tourism Management*, Vol. 106, p. 104969.
- 30
31
32 Liu, B., Moyle, B., Kralj, A. and Li, Y. (2024), “Towards a typology of virtual tourists: Efficacy
33 of visual patterns and attentional cues”, *Tourism Management*, Vol. 105, p. 104943.
- 34
35
36 Marques, C., Vinhas da Silva, R. and Antova, S. (2021), “Image, satisfaction, destination and
37 product post-visit behaviours: How do they relate in emerging destinations?”, *Tourism*
38 *Management*, Vol. 85, p. 104293.
- 39
40
41 Merckx, C. and Nawijn, J. (2021), “Virtual reality tourism experiences: Addiction and
42 isolation”, *Tourism Management*, Vol. 87, p. 104394.
- 43
44
45 Miao, L., Yang, F.X., Hu, J., Wang, K.Y. and Zhang, Q. (2024), “Sense of place of tourism
46 destinations in a metaverse paradigm”, *Tourism Management*, Vol. 105, p. 104958.
- 47
48
49 Molinillo, S., Japutra, A. and Liébana-Cabanillas, F. (2020), “Impact of perceived value on
50 casual mobile game loyalty: The moderating effect of intensity of playing”, *Journal of*
51 *Consumer Behaviour*, Vol. 19 No. 5, pp. 493–504.
- 52
53
54 Mura, P., Tavakoli, R. and Sharif, P.S. (2017), “‘Authentic but not too much’: exploring
55 perceptions of authenticity of virtual tourism”, *Information Technology & Tourism*, Vol.
56
57
58
59
60 17 No. 2, pp. 145–159.

- 1
2
3 Nagy, P. and Koles, B. (2014), “The digital transformation of human identity: Towards a
4 conceptual model of virtual identity in virtual worlds”, *Convergence*, Vol. 20 No. 3, pp.
5 276–292.
6
7
8 Ongsakul, V., Ali, F., Wu, C., Duan, Y., Cobanoglu, C., and Ryu, K. (2021). “Hotel website
9 quality, performance, telepresence and behavioral intentions”, *Tourism Review*, Vol. 76
10 No. 3, pp. 681-700.
11
12
13 Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y. and Podsakoff, N.P. (2003), “Common method
14 biases in behavioral research: a critical review of the literature and recommended
15 remedies.”, *Journal of Applied Psychology*, Vol. 88 No. 5, p. 879.
16
17
18 Santana-Jiménez, Y., Sun, Y.-Y., Hernández, J.M. and Suárez-Vega, R. (2015), “The influence
19 of remoteness and isolation in the rural accommodation rental price among Eastern and
20 Western destinations”, *Journal of Travel Research*, Vol. 54 No. 3, pp. 380–395.
21
22
23 Sharma, S., Styliadis, D. and Woosnam, K.M. (2022), “From virtual to actual destinations: do
24 interactions with others, emotional solidarity, and destination image in online games
25 influence willingness to travel?”, *Current Issues in Tourism*, pp. 1–19.
26
27
28 Statista. (2022), “Virtual reality (VR) - statistics & facts”, available at:
29 <https://www.statista.com/topics/2532/virtual-reality-vr/#topicOverview> (accessed 18
30 June 2024)
31
32
33 Steuer, J. (1992), “Defining Virtual Reality: Dimensions Determining Telepresence”, *Journal*
34 *of Communication*, Vol. 42 No. 4, pp. 73–93.
35
36 Steuer, J., Biocca, F. and Levy, M.R. (1995), “Defining virtual reality: Dimensions determining
37 telepresence”, *Communication in the Age of Virtual Reality*, Vol. 33, pp. 37–39.
38
39
40 Tseng, C. H., and Wei, L. F. (2020). “The efficiency of mobile media richness across different
41 stages of online consumer behavior”, *International Journal of Information Management*,
42 Vol. 50, pp. 353-364.
43
44
45 Tseng, F.-C., Huang, T.-L., Pham, T.T.L., Cheng, T. and Teng, C.-I. (2022), “How does media
46 richness foster online gamer loyalty?”, *International Journal of Information Management*,
47 Vol. 62, p. 102439.
48
49
50 Van Kerrebroeck, H., Brengman, M. and Willems, K. (2017), “When brands come to life:
51 experimental research on the vividness effect of Virtual Reality in transformational
52 marketing communications”, *Virtual Reality*, Vol. 21, pp. 177–191.
53
54
55
56
57
58
59
60

- 1
2
3 Wang, J., Sun, Y., Zhang, L., Zhang, S., Feng, L. and Morrison, A.M. (2024), “Effect of display
4 methods on intentions to use virtual reality in museum tourism”, *Journal of Travel*
5 *Research*, Vol. 63 No. 2, pp. 314–334.
6
7
8 Wei, M., Liu, M., Xu, J., Li, S. and Cao, J. (2022), “Understanding the influence of sensory
9 advertising of tourism destinations on visit intention with a modified AIDA model”, *Asia*
10 *Pacific Journal of Tourism Research*, Vol. 27 No. 3, pp. 259–273.
11
12 Whang, J.B., Song, J.H., Choi, B. and Lee, J.-H. (2021), “The effect of Augmented Reality on
13 purchase intention of beauty products: The roles of consumers’ control”, *Journal of*
14 *Business Research*, Vol. 133, pp. 275–284.
15
16 Wong, I.A., Lin, S.K., Lin, Z.C. and Xiong, X. (2022), “Welcome to stay-at-home travel and
17 virtual attention restoration”, *Journal of Hospitality and Tourism Management*, Vol. 51,
18 pp. 207–217.
19
20 Wong, I.A., Lu, M.V., Lin, S. and Lin, Z. (CJ). (2023), “The transformative virtual experience
21 paradigm: the case of Airbnb’s online experience”, *International Journal of*
22 *Contemporary Hospitality Management*, Vol. 35 No. 4, pp. 1398-1422.
23
24 Wu, H.-C., Ai, C.-H. and Cheng, C.-C. (2020), “Virtual reality experiences, attachment and
25 experiential outcomes in tourism”, *Tourism Review*, Vol. 75 No. 3, pp. 481–495.
26
27 Wu, S., Wong, I.A. and Lin, Z.C. (2021), “Understanding the role of atmospheric cues of travel
28 apps: A synthesis between media richness and stimulus–organism–response theory”,
29 *Journal of Hospitality and Tourism Management*, Vol. 49, pp. 226–234.
30
31 Wu, X. and Lai, I.K.W. (2022), “The use of 360-degree virtual tours to promote mountain
32 walking tourism: Stimulus–organism–response model”, *Information Technology &*
33 *Tourism*, Vol. 24 No. 1, pp. 85–107.
34
35 Yim, M. Y. C., Chu, S. C., and Sauer, P. L. (2017). “Is augmented reality technology an
36 effective tool for e-commerce? An interactivity and vividness perspective”, *Journal of*
37 *Interactive Marketing*, Vol. 39 No. 1, pp. 89-103.
38
39 Ye, S., Lei, S. I., Shen, H., and Xiao, H. (2020). “Social presence, telepresence and customers’
40 intention to purchase online peer-to-peer accommodation: A mediating model”, *Journal*
41 *of Hospitality and Tourism Management*, Vol. 42, pp. 119-129.
42
43 Yeh, S. S., Leong, A. M. W., Hung, C. W., and Huan, T. C. (2024). “Destination authenticity
44 influence on tourists’ behavioral intentions, involvement and nostalgic sentiments”,
45 *Tourism Review*, <https://doi.org/10.1108/TR-09-2023-0670>.
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 Ying, T., Tang, J., Ye, S., Tan, X., and Wei, W. (2022). “Virtual reality in destination marketing:
4 telepresence, social presence, and tourists’ visit intentions”, *Journal of Travel Research*,
5 Vol. 61 No. 8, pp. 1738-1756.
6
7
8 Zhang, S.-N., Li, Y.-Q., Ruan, W.-Q. and Liu, C.-H. (2022), “Would you enjoy virtual travel?
9 The characteristics and causes of virtual tourists’ sentiment under the influence of the
10 COVID-19 pandemic”, *Tourism Management*, Vol. 88, p. 104429.
11
12 Zhao, Y., Jiang, J., Chen, Y., Liu, R., Yang, Y., Xue, X. and Chen, S. (2022), “Metaverse:
13 Perspectives from graphics, interactions and visualization”, *Visual Informatics*, Vol. 6 No.
14 1, pp. 56–67.
15
16
17
18
19 Zhu, J., Cheng, M. and Wang, Y. (Wendy). (2024a), “Viewer in-consumption engagement in
20 pro-environmental tourism videos: A video analytics approach”, *Journal of Travel*
21 *Research*, p. 00472875231219634.
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
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42
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49
50
51
52
53
54
55
56
57
58
59
60
- Zhu, J., Jiang, Y., Jiang, Y., Wang, Y. and Yang, Q. (2023), “The effectiveness of social elements in virtual reality tourism: A mental imagery perspective”, *Journal of Hospitality and Tourism Management*, Vol. 56, pp. 135–146.
- Zhu, J., Jiang, Y., Wang, Y., Yang, Q., and Li, W. (2024b). “Richness and dynamics: how to improve virtual reality tourism adoption with virtual social clues”, *Journal of Research in Interactive Marketing*, Vol. 18 No. 1, pp. 142-158.



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REVIEWER 1

Suggestions/comments from the Reviewer	Response from the Authors
<p>Comments:</p> <p>The draft has been improved to better highlight the novelty and uniqueness of this research. However, we recommend that you review standard articles that employ the PLS-SEM method to present the methodology and results sections more appropriately and align with the standards of a quantitative research paper. Additionally, further enhancements in the discussion section are needed to reach publication quality. Keep up the good work.</p>	<p>Thank you for your detailed and constructive feedback on the manuscript. Your suggestions were really valuable and helpful for revising and improving our paper. According to your suggestions, the authors made revisions to this manuscript which are highlighted in blue.</p>
<p>Additional Questions:</p> <p>1. Originality: Does the paper contain new and significant information adequate to justify publication?: Yes, this paper presents novel insights into the subject of virtual tourism, specifically comparing single- and multi-person interactions. The findings contribute to a deeper understanding of how media vividness influences telepresence, perceived attractiveness, and authentic experiences, and how these factors impact the willingness to visit virtual tourism sites. This study's unique approach and its application of the S-O-R framework and media richness theory provide valuable contributions to the field.</p>	<p>Thank you for your comments.</p>



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2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: **The paper exhibits a comprehensive understanding of the relevant literature in virtual tourism, citing a broad range of sources. However, there is room for improvement in the development of research hypotheses, particularly in section 2.5 "Willingness to Visit," which currently lacks rigor. The discussion should present hypotheses in a bidirectional manner, considering both potential outcomes rather than a unidirectional argument. Additionally, the research model should be introduced after fully developing the research hypotheses to ensure a more cohesive and logical presentation. This enhancement will strengthen the theoretical foundation and contribute to a more robust analysis.**

Thank you for your insightful comments on this manuscript. In response to your suggestions, the authors refined Section 2.5, "Willingness to Visit." Specifically, we have enhanced the discussion on the relationships between telepresence, perceived authenticity, perceived attractiveness, and willingness to visit.

Please refer to pages **5-6**:

" 2.5 Willingness to visit

Numerous studies have established a link between telepresence and travel intentions. Telepresence occurs during virtual experiences, particularly in the marketing of services (Ongsakul et al., 2017). This phenomenon leverages technological mediation to simulate reality, creating the illusion of interacting with the physical world and thereby influencing consumer decision-making processes. Telepresence enhances interest and positive perceptions of destinations, leading to stronger intentions to visit (Ying et al., 2022). Furthermore, it facilitates the assimilation of multi-dimensional information, enriching sensory experiences. However, excessive telepresence may lead to information overload, thereby diminishing consumer responsiveness (Cowan and Ketron, 2019).

The relationship between perceived authenticity and travel intentions has exhibited significant dynamics. Perceived authenticity positions virtual travel as a viable alternative for homebound activities, particularly during travel restrictions (Kim et al., 2020). Moreover, the realism achieved in



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virtual tourism enhances perceptions of destinations (Ye et al., 2020), prompting the progression from virtual to actual tourism. However, some research highlighted a nuanced link between authenticity and travel intentions, suggesting that in certain contexts, such as virtual tours of historical sites, authenticity may provoke negative attitudes (Yeh et al., 2024).

As a crucial component of hedonic value, perceived attractiveness is considered pivotal in shaping consumer's willingness to use a product or service (Molinillo et al., 2020). From one perspective, perceived attractiveness reflects reactions to destinations, encompassing both emotional and cognitive dimensions. Consequently, when virtual tourism destinations offer sufficient allure, tourists are more inclined to visit the corresponding physical destinations (Ying et al., 2022).

In general, telepresence, perceived authenticity, and perceived attractiveness show a stronger correlation with willingness to visit. This study aims to explore the role of psychological perception and sensation in influencing the willingness to visit. Accordingly, the following hypotheses were proposed:

H6: Telepresence positively affects the willingness to visit.

H7: Authentic experiences positively affect the willingness to visit.

H8: Perceived attractiveness positively affects the willingness to visit.



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<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32</p>	<p>Secondly, we adjusted the structure of the paper. After fully developing the research hypotheses, we introduced the research model, which is now described in detail.</p> <p>Please refer to page 7:</p> <p>“Based on the hypotheses above, the researchers developed the theoretical model for this study (Figure1). The research model is anticipated to offer novel insights into the field of virtual tourism, particularly by comparing single- and multi-person interactions. The findings are expected to contribute to a deeper understanding of how media vividness influences telepresence, perceived attractiveness, and authentic experiences, and how these factors affect the willingness to visit virtual tourism sites.”</p>
<p>33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56</p> <p>3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?:</p> <p>The paper's argument is grounded in a solid theoretical framework, utilizing the stimulus-organism-response (S-O-R) framework and media richness theory (MRT). However, the methodology section requires more clarity and detail. Specifically, Table 1, "Demographic Profile of Respondents," should be moved to the research results section.</p> <p>In the methodology section, the development of indicators and scales should be discussed before</p>	<p>Thank you for your valuable comments. The researchers followed your insightful suggestions and refined the "3. Methodology" section accordingly.</p> <p>Please refer to pages 7-9:</p> <p>“3 Methodology</p> <p>3.1 Measurement</p> <p>This research employed a quantitative design. A questionnaire consisting of 16 items across five constructs -- vividness, telepresence, authentic experiences, perceived attractiveness, and willingness to visit -- was used. Established scales were utilized to ensure reliable and valid measurements. The vividness scale, comprising three items, was</p>



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addressing the sample and data collection process. It should be specified which indicators were adapted from existing literature and which were proposed by the authors. Additionally, the data processing techniques should be clearly explained, detailing the use of SPSS and SmartPLS for specific purposes. The choice of PLS-SEM over CB-SEM should be justified, highlighting the reasons for its selection based on the research objectives and data characteristics. This will provide a more comprehensive and transparent explanation of the research design and methods employed.

adapted from Kelley *et al.* (1989) and Kim and Ko (2019). The telepresence scale, with four items, was from Choi *et al.* (2016); the authentic experience scale, with three items, was sourced from Kim *et al.* (2020); the perceived attractiveness scale, also with three items, was adapted from Molinillo *et al.* (2020); and the willingness to visit scale, with three items, was adapted from Sharma *et al.* (2022) and Lam and Hsu (2006). The questionnaire was translated into Chinese, and peer experts were invited to professionally evaluate the scales. The back-translation method was employed, ensuring the required precision rate (Edunov *et al.*, 2018). All items were measured on a seven-point Likert scale, ranging from (1) strongly disagree to (7) strongly agree, due to its high reliability and discriminant validity. Additionally, socio-demographic questions were included to gather information on respondents (e.g., gender, age, education, and monthly income).

3.2 Data collection and procedure

A survey tool was used to collect data in April 2022 via www.wjx.cn, one of the largest online survey platforms in China. The questionnaires were distributed and completed on social media platforms, including WeChat, Weibo, and Douban, and were also shared in VR online groups. The initial question in the form asked whether participants had previously experienced virtual tours, and only those who had were selected for the study. Participants were then randomly divided into two equal groups: one group viewed a single-person interaction video, and the other watched a multi-person interaction video before completing the questionnaire.

Drawing on the research of Sharma *et al.* (2022), the interaction videos used were from



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the game Grand Theft Auto V (GTA 5). In this game, "Los Santos" is a virtual city modeled on Los Angeles, allowing players to experience the city as a virtual perspective. The researchers recorded 60-second videos from this game, simulating either a single-player or multi-player scenario (as shown in Figures 2 and 3). Both videos included a virtual roller coaster ride, with the multi-person video also featuring a communication scene with other players after the ride.

At the beginning of the questionnaire, participants were informed about the concepts of "virtual tourism," "single-person interaction," and "multi-person interaction." Before viewing the stimulus material, an example of a 360° panoramic virtual tour of the Forbidden City was shown to help them better understand the concept of "virtual tourism" as used in this research (as shown in Figure 4). In the formal test, a dwell time was set for each page, allowing participants to proceed to the next page only after viewing the stimulus material. Participants were required to complete a questionnaire after watching the video. To ensure the validity of the responses, questionnaires completed in less than 180 seconds were considered invalid.

3.3 Data analysis

In this research, the data analysis techniques and process were as follows. Initially, SPSS 26.0 was used to analyze the demographic characteristics of the sample. Next, common method variance was examined. Subsequently, partial least squares structural equation modeling (PLS-SEM) was employed to assess the measurement and structural models using SmartPLS 4.0.9.2 software. The moderating role of interaction type was tested through multi-group difference analysis (MGA). Compared to covariance-based



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	<p>structural equation modeling (CB-SEM), PLS-SEM is particularly appropriate for models with numerous constructs and small sample sizes (Hair <i>et al.</i>, 2021), making it well-suited for this research.”</p>
<p>4. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: The results are presented clearly and analyzed appropriately, but there are areas that need improvement for a more robust analysis. The evaluation criteria for the measurement model should be reassessed:</p> <p>Inner VIF: Ensure that the inner VIF values are below 5, or preferably below 3, to avoid multicollinearity issues. The current threshold of 10 is inadequate.</p> <p>Discriminant Validity: Apply the HTMT (Heterotrait-Monotrait ratio) approach along with the Fornell and Larcker (1981) criteria to ensure the discriminant validity of the constructs.</p> <p>Model Assessment: Consider examining additional model values such as the effect size f^2, predictive relevance Q^2, and relative impact q^2, if possible.</p>	<p>Thank you for your detailed and constructive feedback on the manuscript. Your suggestions were helpful in revising and improving our paper. The researchers have incorporated your valuable insights and refined the entire "4 Results" section accordingly.</p> <p>Please refer to pages 10-15:</p> <p>4 Results</p> <p>“4.1 Respondent profiles</p> <p>SPSS 26.0 was used to perform descriptive statistical analysis on the sample. Table 1 presents the demographic characteristics of the participants. A total of 579 individuals participated in this research. In the single-person interaction group, 279 participants were recruited, with approximately 43.4% male and 56.6% female. In the multi-person interaction group, 279 participants were also recruited, with approximately 49.5% male and 50.5% female. Both groups exhibited similar demographic characteristics in terms of education and monthly income.</p> <p>4.2 Common method variance</p> <p>The issue of common method variance in the sample of the two groups was first assessed. Harman’s one-factor test was conducted using SPSS 26.0 to examine</p>



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this issue. The results showed that the variance contribution of the first factor in both groups was less than 50%, indicating that common method bias was not a significant problem in this research (Podsakoff et al., 2003).

4.3 Measurement model analysis

Following the steps suggested by Hair et al. (2019), factor loadings were examined, and the results showed that all loadings in both models were above 0.708, providing acceptable item reliability. Additionally, as presented in Table 2, the composite reliability (CR) and Cronbach's Alpha values were higher than 0.7, indicating that the reliability of the constructs met the required standards. Convergent validity was then evaluated by calculating the average variance extracted (AVE) values. The results indicated that all AVE values were greater than 0.5, confirming acceptable convergent validity for each construct (Hair et al., 2021).

The discriminant validity of the constructs was examined using two approaches. First, the Fornell and Larcker (1981) criterion was applied. The values on the diagonal (square root of AVEs) were higher than the respective correlation coefficients, indicating acceptable discriminant validity for the single- and multi-person interaction models (Table 3). Additionally, the HTMT (Heterotrait-Monotrait) approach was employed. The results showed that the HTMT values were below 0.9, confirming acceptable discriminant validity (Hair et al., 2021).



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4.4 Structural model analysis

Several steps were followed to examine the structural model in PLS-SEM. First, this research assessed the structural model for collinearity. All items were tested for variance inflation factor (VIF) values, with the results indicating that the VIF values for both groups were below 3, suggesting that collinearity was not a concern in this research (Hair et al., 2021). Next, the R^2 values of the endogenous constructs were provided to better estimate the explanatory power. As shown in Table 4, the R^2 values in the multi-person group ranged from 0.480 to 0.594, and the R^2 values in the single-person group ranged from 0.310 to 0.488, all of which were higher than 0.13 (Cohen, 1988). The results indicated that the explanatory power of the two models was moderate (Hair et al., 2011; Henseler et al., 2009).

In addition, f^2 effect sizes were calculated to assess the strength of the relationship between the latent variables. As suggested by Cohen (1988), values higher than 0.02, 0.15, and 0.35 indicate small, medium, and large f^2 effect sizes, respectively. For the multi-person interaction group, the results revealed that the f^2 effect sizes ranged from 0.022 (small) for the effect of telepresence on willingness to visit to 0.640 (large) for the effect of vividness on telepresence. For the single-person interaction group, the f^2 effect sizes ranged from 0.014 (negligible) for the effect of telepresence on willingness to visit to 0.448 (large) for the effect of vividness on telepresence. In this research, Q^2 values were used to measure predictive relevance by accessing the model's ability to predict endogenous latent variables (Hair et al., 2021).



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<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33</p>	<p>As shown in Table 4, the Q2 values for the endogenous constructs in both groups were above 0, indicating that the PLS path models had predictive accuracy (Hair et al., 2019).</p> <p>4.5 Moderating effect of interaction type</p> <p>Since interaction type was a categorical variable, Bootstrap multi-group SEM analysis was used to verify its moderating effect. Results with non-significant moderating effects were excluded (Table 7). The interaction type was found to significantly moderate the path from vividness to telepresence in all paths, thus supporting H₉. The negative numbers implied a stronger moderating effect in the multi-person group for the same path, whereas positive numbers indicated a stronger effect in the single-person group. Moreover, the effect of vividness on telepresence was stronger in multi-person interactions compared to single-person interaction environments.</p>
<p>34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60</p> <p>5. Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: The paper clearly identifies significant implications for research, practice, and society, bridging the gap between theory and practice effectively. The implications are well-aligned with the findings and conclusions of</p>	<p>Thank you very much for your encouragement and positive feedback.</p>



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the study.	
6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: The paper successfully communicates its case clearly and is well-suited for publication.	Thank you very much for your comments and supportive feedback.