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Immersive time in the metaverse and visits to the physical world: why not both? A holistic customer engagement framework

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## Immersive time in the metaverse and visits to the physical world: why not both?

### A holistic customer engagement framework

#### Abstract

**Purpose** – Through the theoretical lenses of media richness, perceived realism, and customer engagement, this study investigates the mechanisms that promote customer engagement in metaverse-mediated environments in the meetings, incentives, conferences, and exhibitions (MICE) context, as well as the impact of customer engagement on customers' metaverse usage intensity and future visit intention.

**Design/methodology/approach** – A survey of customers who have experience with metaverse-mediated MICE activities was conducted. Data from 267 respondents were analysed using PLS-SEM and fuzzy-set qualitative comparative analysis (fsQCA) to test our research framework.

**Findings** – Media richness dimensions, including multiple cues, immediate feedback and personal focus, were found to enhance perceived metaverse realism which in turn affects the dimensions of customer engagement, leading to customers' metaverse usage intensity and future visit intention. The fsQCA analysis identifies three configurations that lead to high event visit intention.

**Practical implications** – This research helps developers and marketers better understand how rich media contents create realistic experiences in the metaverse, aiding them to devise strategies for customer engagement and improve resource allocation.

**Originality/value** – Despite its potentially revolutionary impacts, empirical studies on the mechanisms driving customer engagement in the metaverse and its effects are scarce. This study contributes by revealing the multiple-phase mechanism of the customer engagement journey in the metaverse-mediated MICE context. By expanding the media richness theory into

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3 this area, our study provides new insights by illustrating how media richness dimensions create  
4 multisensory experiences and real-time interactions, enhancing perceived metaverse realism  
5 and customer engagement. It also addresses the debate on whether metaverse-mediated events  
6 substitute or complement real-life events.  
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13 **Keywords: Metaverse, media richness, perceived realism, customer engagement, MICE**  
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### 16 17 **1. Introduction**

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19 The metaverse is considered the next generation of information communication technology in  
20 the era of Web 3.0, which integrates the frameworks of the Internet and social media into an  
21 online three-dimensional virtual world (Gursoy *et al.*, 2023). The metaverse refers to a shared  
22 virtual space that people can navigate to participate in various activities and interact with their  
23 virtual friends through their personalised avatars (Ahn *et al.*, 2022). Utilising immersive  
24 technologies, such as virtual reality (VR), augmented reality (AR) and mixed reality (MR),  
25 developers create metaverse-mediated environments consisting of highly emulated subjects,  
26 objects, and activities, which empower customers to participate in various activities and  
27 interact with other actors through avatar embodiments (Gursoy *et al.*, 2023). Prime examples  
28 include participating in virtual events (e.g., exhibitions, concerts, festivals and sports matches),  
29 visiting destinations and attractions (e.g., museums, cultural heritage and street attractions),  
30 and attending virtual conferences (Buhalis and Karatay, 2022; Yang and Wang, 2023).  
31 Metaverse-mediated environments allow customers to interact with different actors, such as  
32 marketers, event hosts, tour guides, influencers and other customers, and engage in real-time  
33 experience sharing (Buhalis, O'Connor, *et al.*, 2022).  
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45 According to recent studies, as customers get used to participating in virtual-based events  
46 since the outbreak of COVID-19, marketers have increasingly utilised immersive technologies  
47 to organize MICE activities to connect with customers across the world without geographical  
48 boundaries (Buhalis, O'Connor, *et al.*, 2022). By utilising rich media contents supported by  
49 the metaverse, marketers create multisensory experiences for customers to participate in MICE  
50 activities in metaverse-mediated environments (Flavián *et al.*, 2019, 2021). Despite the  
51 promising development and growing importance of the metaverse in the tourism and hospitality  
52 industries, empirical understanding of its effectiveness in triggering positive outcomes,  
53 including metaverse usage intensity and future visit intention, remains limited. This limitation  
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3 creates difficulties for marketers to devise effective strategies to engage customers in  
4 metaverse-mediated MICE activities and improve resource allocation. Thus, we are motivated  
5 to explore the following research question: How can marketers effectively drive customers'  
6 metaverse usage intensity and future visit intention? We attempted to address this research  
7 question by exploring the multiple phases of the customer engagement journey in the metaverse  
8 (Ahn *et al.*, 2022; Buhalis *et al.*, 2023).  
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14 Customer engagement is inseparable from marketers' ability to create real-world-like  
15 virtual environments that empower customers to see, hear and feel, along with engaging in  
16 realistic interactions with actors in the metaverse-mediated environments as if they were in the  
17 real world (Flavián *et al.*, 2019). To assess the importance of real-world-like metaverse-  
18 mediated environments in facilitating customers' engagement journey, it is also important to  
19 understand how rich media contents facilitate perceived metaverse realism. Given the potential  
20 importance of rich media contents, recent studies have called for empirical research on the  
21 impact of rich media contents in facilitating realistic metaverse-mediated environments (Ahn  
22 *et al.*, 2022). Drawing upon the customer-metaverse engagement framework proposed by Ahn  
23 *et al.* (2022) and on the media richness theory (MRT) (Trevino *et al.*, 1987), we posit that  
24 perceived metaverse realism, which is denoted as the degree to which the metaverse  
25 representation relates to real-world experiences (Daassi and Debbabi, 2021), is influential in  
26 driving customer engagement, which in turn facilitates positive customer behaviours in and out  
27 of the metaverse (Ahn *et al.*, 2022). Arguably, rich media contents are useful in reproducing  
28 real-life-like environments that empower customers to experience virtually-reality  
29 amalgamated events through metaverse-mediated environments as if they were in the real  
30 world (Mladenović *et al.*, 2023). Based on MRT (Trevino *et al.*, 1987), this study has identified  
31 four media richness dimensions, including multiple cues, immediate feedback, personal focus,  
32 and language variety and examined their effects on the perceived metaverse realism and  
33 customer engagement.  
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49 This study contributes to the marketing literature by showing the multiple-phase  
50 mechanism of the customer engagement journey in the metaverse-mediated MICE context. Our  
51 research framework is underpinned by the MRT, perceived realism and customer engagement,  
52 providing meaningful implications for demonstrating the effects of various MRT dimensions  
53 on perceived metaverse realism, which in turn drives customer engagement. An additional  
54 contribution is made by exploring the importance of customer engagement dimensions in  
55 driving customers' behaviours in and out of the metaverse, as manifested by metaverse usage  
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3 intensity and future visit intention. Lastly, this study also sheds light on the metaverse literature  
4 by confirming the positive relationship between metaverse usage intensity and future visit  
5 intention. These findings provide meaningful implications for developers and marketers who  
6 wish to engage with customers by creating authentic experiences in the metaverse-mediated  
7 MICE context.  
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## 14 **2. Theoretical background**

### 15 **2.1. Media richness theory**

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18 Media richness theory offers a framework for understanding customer experiences in the  
19 metaverse by focusing on communication channels' ability to convey information effectively  
20 (Daft and Lengel, 1986). According to MRT, channels vary in their ability to convey rich  
21 information, helping users achieve personalised goals and resolve message ambiguities (Tseng  
22 *et al.*, 2017). Tasks dictate the choice of communication channels, with simple tasks favouring  
23 low-richness media and complex tasks requiring richer content (Trevino *et al.*, 1987). In the  
24 context of MICE activities, where interactions are complex, customers gravitate towards rich  
25 media for effective communication. The metaverse, with its capacity for high-richness media,  
26 is increasingly utilised by marketers to create immersive experiences and continuous  
27 interactions through avatars (Ahn *et al.*, 2022). Thus, media richness plays a pivotal role in  
28 fostering real-life-like metaverse environments that enhance customer engagement, meriting  
29 further research attention.  
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40 According to MRT, media richness consists of four components: multiple cues,  
41 immediate feedback, personal focus and language variety (Tseng *et al.*, 2022). Multiple cues  
42 represent the ability of channels or technology platforms to disseminate a variety of  
43 information cues with explicit and implicit meanings, including verbal cues featuring spoken  
44 word, voice inflection, and video chats, along with nonverbal expressions, such as facial  
45 expression, distancing, body language and body movements. Immediate feedback is the ability  
46 of channels or technology platforms to provide timely feedback and allow users to respond to  
47 the messages received promptly. Personal focus is the ability of channels and technology  
48 platforms to enable customised messages based on users' specific needs or situations.  
49 Language variety is the ability of a communication medium to use rich and varied languages  
50 (e.g., text, symbols, photos, videos, audio, links and other multimedia data) to convey  
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3 information. These dimensions aid in conveying rich messages, fostering real-time interactions  
4 and knowledge exchange in virtual environments.  
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7 Utilising immersive technologies, marketers create rich media in metaverse environments,  
8 three-dimensional virtual spaces where customers control avatars to convey messages with  
9 human-like emotions via emojis, texts, voice, and actions (Ahn *et al.*, 2022). These human-like  
10 messages create multisensory experiences, allowing customers to explore different aspects of  
11 life and simulate real-life events, fostering imagination about real-life experiences (Flavián *et*  
12 *al.*, 2021). Customers can use personalised avatars to participate in real-world-like events (e.g.,  
13 concerts, and exhibitions tailored to their needs) and gain real-world knowledge, integrating  
14 virtual experiences across centuries and geographic boundaries (Gursoy *et al.*, 2023). When  
15 marketers empower customers to interact using rich media (e.g., verbal communication, video  
16 sharing, body language), these multisensory experiences serve as authentic pre-experiences,  
17 strengthening psychological connections and behavioural intentions (Flavián *et al.*, 2019).  
18 Recent studies highlight the need for marketers to enhance the richness of metaverse content,  
19 creating multisensory experiences that simulate real-world scenarios, thereby fostering  
20 authentic enjoyment and enhancing customer engagement (Ahn *et al.*, 2022). While MRT is  
21 suitable for exploring customer experiences in the metaverse (Mladenović *et al.*, 2023), the  
22 mechanisms through which rich media content generates multisensory and authentic  
23 experiences (perceived metaverse realism) and its impacts on customer engagement in and out  
24 of the metaverse require further investigation. Thus, we examine the significance of the four  
25 dimensions of media richness in understanding how they contribute to authentic experiences.  
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## 43 **2.2. Real-life-like environment in the metaverse - perceived metaverse realism**

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45 Perceived realism is an important concept in media studies to explain how media content  
46 persuades, attracts and motivates customers (Busselle and Bilandzic, 2008). The concept of  
47 perceived realism has evolved alongside technological advancements, encompassing  
48 customers' assessments of media representation, video games, VR technologies, and the  
49 metaverse. In traditional media contexts, realism is gauged by the extent to which media  
50 content replicates real-world experiences (Cho *et al.*, 2014). In the context of video games,  
51 realism is attained when players immerse themselves in unique virtual environments, enabling  
52 them to manipulate game elements to achieve their objectives, including creating characters,  
53 selecting storylines, and interacting with fellow players. (Ribbens *et al.*, 2016). In VR  
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3 technologies, high perceived realism occurs when customers are immersed in virtual  
4 environments that enable them to interact with objects, altering colours, shapes, and positions  
5 as they choose (Flavián *et al.*, 2019). Here, perceived realism is not only evaluated by its audio-  
6 visual reality but manifested by the ability of virtual-mediated subjects, objects and activities  
7 to simulate real-life contexts.  
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12 In the context of the metaverse, scholars suggest that realism is manifested by its  
13 distinctive features that support customers' second-life experiences (Gursoy *et al.*, 2023). More  
14 specifically, metaverse-mediated experience is perceived as realistic when customers are  
15 empowered to utilise their personalised avatars to participate in real-world-like environments  
16 and engage in genuine interactions (Ahn *et al.*, 2022; Yang and Wang, 2023). Customers are  
17 empowered to tailor their experiences based on their interests and to explore different stories,  
18 scenarios and events without boundaries in highly simulated metaverse-mediated environments.  
19 These environments enable them to obtain knowledge about the real world. This will then  
20 create multisensory stimulation for customers to imagine how real-world events might unfold  
21 (Flavián *et al.*, 2021), which in turn increases their intention to spend more time in such  
22 environments (Buhalis *et al.*, 2023). Based on the aforementioned, this study defines perceived  
23 metaverse realism as the degree to which the avatars can represent themselves to control their  
24 experiences in metaverse-mediated environments. Given its importance, recent studies have  
25 suggested marketers to create rich media contents to create real-life-like experiences for  
26 customers (Ahn *et al.*, 2022; Gursoy *et al.*, 2023; Mladenović *et al.*, 2023), which in turn  
27 facilitates customer engagement journey in the metaverse.  
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### 42 **2.3. Customer engagement in the metaverse-mediated environment**

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44 Customer engagement is arguably inseparable from marketers' ability to create realistic virtual  
45 environments (e.g., objects, stories, events, activities, characters and avatars) that allow  
46 customers to have realistic experiences (Hollebeek *et al.*, 2020). Customer engagement is  
47 generally conceptualised as customers' psychological state reflected by their cognitive,  
48 emotional and behavioural activities when interacting with virtual environments (Harrigan *et*  
49 *al.*, 2017). Specifically, customers' cognitive efforts are indicated by their levels of absorption,  
50 while emotional attachment is indicated by their level of enthusiasm. In addition, behavioural  
51 activities are manifested by their participative behaviours in virtual environments (Harrigan *et*  
52 *al.*, 2017; Ndhlovu and Maree, 2022).  
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3 As customer engagement is largely driven by dynamic technological environments that  
4 can effectively motivate customers to be psychologically connected and invest their resources  
5 in interacting with the focal object, customers' engagement with virtual platforms is argued to  
6 be reflected by their absorption, affection and participation (Hollebeek *et al.*, 2020; Ndhlovu  
7 and Maree, 2022). Absorption is a customer's immersion in the metaverse, which is manifested  
8 by their attention and involvement in the metaverse-mediated environment (Cheung *et al.*,  
9 2015). Affection refers to customers' emotional attachment and enthusiasm towards the  
10 metaverse-mediated environment (Harrigan *et al.*, 2017). Participation is the amount of  
11 resources invested by customers in interacting with different actors, which creates value for the  
12 metaverse-mediated environment (Ndhlovu and Maree, 2022).

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21 Highly engaged customers tend to invest considerable time, energy and effort in the  
22 metaverse-mediated environment, which increases their intention to attend events in the  
23 physical world. Recognizing the importance of customer engagement, this study explores the  
24 multiple stages of customer engagement in the metaverse.

### 25 26 27 28 29 30 31 **3. Research framework and hypothesis development**

#### 32 33 34 ***3.1. Relationship between media richness and perceived metaverse realism***

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36 Metaverse-mediated environments allow customers to control their avatars to convey verbal  
37 information using various communication messages, such as text, voice, videos, links, images  
38 and animations, and nonverbal expressions using body language, gestures and postures, to  
39 transmit rich meanings, ultimately enhancing social connectedness and enjoyment  
40 (Mladenović *et al.*, 2023; Tseng *et al.*, 2022). Rich media contents with multiple cues (e.g.,  
41 text, pictures, sound, and motion) are vital in creating multisensory pre-experiences in virtual  
42 environments, which in turn improve the perceived authenticity of virtual-mediated  
43 experiences (Ahn *et al.*, 2022).

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50 Previous studies suggest that multiple cues facilitate customer collaboration with various  
51 actors (e.g., like-minded peers and event hosts) to gather rich information and establish  
52 authentic social connections in virtual-mediated environments, thereby enhancing their  
53 understanding of the real world. Han *et al.* (2020) found that customers enjoyed the realistic  
54 experience in VR shopping when they could use nonverbal expressions (e.g., body movements,  
55 postures and actions). Flavián *et al.* (2021) found that haptic cues (e.g., touch, feel and  
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3 movements), facilitated by technological embodiment, are influential in resembling real-life  
4 experience, which in turn creates authentic pre-experiences for customers to “taste” their  
5 interested destinations before actual visitation. In the metaverse, customers engage and  
6 collaborate with various actors using multiple cues to achieve realistic goals, such as cultural  
7 heritage exploration, participation in exhibitions, and discussions on real-world issues in virtual  
8 conferences (Ahn *et al.*, 2022). Therefore, metaverse-mediated events are perceived as  
9 authentic when customers utilise verbal and nonverbal cues to interact with actors and objects,  
10 leading to the following hypothesis:  
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18 H1: Multiple cues are positively associated with perceived metaverse realism.  
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23 Metaverse-mediated environments allow actors to engage in real-time interactions,  
24 enabling customers to share their ideas and experiences promptly (Buhalis *et al.*, 2023). Real-  
25 time interactions can be facilitated by empowering customers to share immediate feedback  
26 during their journeys, which in turn increases the perceived authenticity of metaverse-mediated  
27 events (Buhalis, Lin, *et al.*, 2022). For example, when customers are empowered to receive,  
28 share and modify the contents of metaverse-mediated events in a timely manner, they are  
29 motivated to engage in real-time interactions to actively discuss the details of events with other  
30 actors, which in turn facilitates customers’ imagination of how real-life events will unfold. In  
31 addition, real-time interaction via communication with other actors using timely messages (e.g.,  
32 texts, pictorial contents or voice) generates experiential value, which improves customers’  
33 knowledge about the details of real-life events.  
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43 The importance of immediate feedback in facilitating real-time interaction that enhances  
44 the perceived authenticity of virtual-mediated experiences is supported by the literature.  
45 Martínez-Molés *et al.* (2022) found that when customers are empowered to provide timely  
46 messages and feedback in virtual-mediated environments, the real-time interactions and the  
47 virtual-mediated experience are perceived as realistic to them as in the real world. In the context  
48 of the metaverse, when customers can engage in real-time interactions by sharing their instant  
49 ideas, messages, and feedback, these interactions are perceived as genuine and realistic  
50 (Mladenović *et al.*, 2023). As such, immediate feedback that facilitates real-time interaction is  
51 useful in creating authentic experiences, leading to the following hypothesis:  
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3 H2: Immediate feedback is positively associated with perceived metaverse realism.  
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8 Metaverse-mediated environments allow actors to customise their messages based on  
9 their specific needs or situations, creating a sense of human warmth and authenticity, and  
10 enabling customers to express themselves and participate in activities similar to those found in  
11 the physical world (Buhalis *et al.*, 2023). Additionally, customers can create and customise  
12 their avatars to express personalised feelings and achieve personal goals in the metaverse. This  
13 allows them to gain real-world knowledge, such as information about events and exhibitions,  
14 and participate in group-based events resembling those in the physical world (Gursoy *et al.*,  
15 2023). As such, personalised experiences are created through technology that supports  
16 customised avatars and messages, enhancing the perceived authenticity of virtual-mediated  
17 experiences.  
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26 Studies have shown the importance of personalised content in virtual environments to  
27 create authentic experiences. For example, Cheung *et al.* (2015) found that personalised  
28 gaming content influences customers' psychological connectedness, as they control their  
29 customised characters to face realistic challenges. In the context of VR tourism, Leung *et al.*  
30 (2022) found that customers enjoy realistic destination experiences when they can control the  
31 content and visual perspectives of the VR environment based on their specific needs. Tsai  
32 (2022) found that personalised metaverse destination tours enhance customers' experience of  
33 realistic attractions. Based on the above discussion, we propose that user-centric content  
34 enables actors like marketers, tour guides, and customers to customise messages for personal  
35 relevance, enhancing real-life experiences of events and destinations. This fosters human  
36 warmth and authenticity, leading to the following hypothesis:  
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45 H3: Personal focus is positively associated with perceived metaverse realism.  
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50 In metaverse-mediated environments, customers control their avatars, enabling them to  
51 convey messages verbally and nonverbally through various means, including multilingual text  
52 messages, emojis, symbols, non-lexical sounds, and body expressions (Mladenović *et al.*,  
53 2023). Prior studies have demonstrated the importance of language variety in creating authentic  
54 experiences in virtual environments. For example, Lin and Chen (2015) demonstrated that an  
55 augmented reality query-answering system supporting various languages (e.g., sounds, images,  
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and animations) empowers customers to acquire knowledge about unique cultures in the physical world. Tseng *et al.* (2022) showed that customers are willing to use different languages to express themselves and engage in genuine interactions with like-minded peers in online games, thus creating a sense of human warmth in the online gaming environment. Buhalis and Karatay (2022) proposed that when customers are supported in utilising varied languages to interact with other actors (e.g., marketers, influencers, and tour guides) in metaverse-mediated environments, they are motivated to participate in group-based activities that enable them to fulfil their goals in the physical world. In summary, research has demonstrated the importance of using languages (e.g., text, images, videos and physical senses) in facilitating real-life-like interactions and creating realistic event experiences (Buhalis and Karatay, 2022; Tseng *et al.*, 2022), leading to the following hypothesis:

H4: Language variety is positively associated with perceived metaverse realism.

### ***3.2. Relationship between perceived metaverse realism and customer engagement***

Metaverse-mediated environments provide customers with experiences using VR integration, allowing them to develop interpersonal relationships with other actors, participate in activities, and contribute to virtual events by controlling their avatars (Yang and Wang, 2023). The degree of authenticity produced by metaverse-mediated environments contributes to customers' experiential value, creating multisensory experiences (e.g., seeing, hearing, touching, and feeling) for customer enjoyment (Flavián *et al.*, 2021). This, in turn, increases their intention to exert cognitive efforts, becoming deeply engrossed and actively participating in metaverse-mediated events (Ahn *et al.*, 2022).

Empirical studies have shown that high-verisimilitude virtual environments increase customers' psychological connectedness, supporting the link between realism and customer engagement. Customers are more likely to be immersed in virtual environments when the experience is authentic and resembles the physical world. Kim and Ko (2019) found that customers were totally focused on VR sports games when the virtual environments and activities are perceived as authentic and can resemble real-world sports events. Kim *et al.* (2020) found that authentic VR tourism activities are meaningful stimuli for triggering customers' flow state and enjoyment. Ahn *et al.* (2022) argued that customers are likely to be

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3 immersed in the metaverse when they are empowered to utilise immersive technologies to  
4 participate in real-life-like events. Given the above, we suggest that customers immerse  
5 themselves deeply in metaverse-mediated events perceived as realistic, resulting in the  
6 following hypothesis:  
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13 H5: Perceived metaverse realism is positively associated with absorption.  
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18 Prior studies have demonstrated the positive relationship between authentic virtual  
19 experiences and customers' positive emotions. For example, Martínez-Molés *et al.* (2022)  
20 found that customers are satisfied and enjoy experiencing cruise vacations with VR when they  
21 discover that they can have similar cruise-related experiences in VR-mediated environments  
22 as they do in real life. Yu *et al.* (2023) found that virtual tourism heightens multisensory  
23 experiences, mimics real-world destinations and increases perceived enjoyment, thus  
24 enhancing destination knowledge. Furthermore, there have been propositions predicting the  
25 associations between authentic experiences and affection in the metaverse context (Ahn *et al.*,  
26 2022; Gursoy *et al.*, 2023). Thus, we hypothesize that:  
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36 H6: Perceived metaverse realism is positively associated with affection.  
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41 Authentic virtual experiences are found to be vital in encouraging customers' participation  
42 because customers are likely to enjoy and become emotionally involved in participating in  
43 virtual-mediated activities when they believe the virtual-based experiences can resemble the  
44 physical world. Kim *et al.* (2020) found the importance of authentic VR tourism experiences  
45 in driving customers' enjoyment, which in turn strengthens their involvement in VR tourism  
46 activities and motivates them to participate continuously. Notably, there have been  
47 propositions predicting the importance of authentic experiences in driving customers'  
48 participation in the metaverse context. Ahn *et al.* (2022) suggested marketers utilise immersive  
49 technologies to create multisensory experiences for customers, which in turn drives customer  
50 participation in metaverse-mediated events. Based on the discussion above, we posit that  
51 customers who believe that metaverse-mediated environments simulate events similar to those  
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3 in the physical world are more willing to participate in metaverse-mediated events than other  
4 customers, leading to the following hypotheses:  
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10 H7: Perceived metaverse realism is positively associated with participation.  
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### 14 **3.3. Relationship between customer engagement with metaverse usage intensity and future** 15 **visit intention** 16 17

18 Immersive metaverse time is conceptualized as customers' conscious, deliberate and  
19 dedicated time spent on engaging with metaverse-mediated environments (Mogaji *et al.*, 2023).  
20 Despite its conceptual importance, empirical evidence exploring its measurement and  
21 mechanisms that increase immersive metaverse time is yet to be explored. Based on Van Doorn  
22 *et al.*'s (2010) customer engagement framework, customers' immersive time spent in virtual-  
23 mediated environments is manifested by their usage intensity which is measured by duration,  
24 frequency and recency of usage (Cheung *et al.*, 2015; Suh, 2023). In this study, customer  
25 engagement dimensions are expected to be positively associated with customers' metaverse  
26 usage intensity. Recent studies have argued that when customers are immersed in and  
27 enthusiastic about participating in events and activities in metaverse-mediated environments,  
28 they are likely to experience realistic events more frequently and spend more time in  
29 metaverse-mediated events than other customers (Mogaji *et al.*, 2023; Suh, 2023).  
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40 Studies have also proposed that customers' actual usage in virtual environments is driven  
41 by their enjoyment of immersive experiences. Cheung *et al.* (2015) showed that highly engaged  
42 customers are immersed and deeply engrossed in online games, which increases their  
43 frequency and intensity of playing online games. Dincelli and Yayla (2022) highlighted the  
44 importance of immersive metaverse experiences in facilitating customer engagement and  
45 metaverse usage. Based on the aforementioned, we posit that immersive metaverse experiences  
46 are influential in driving customers' metaverse usage, leading to the following hypothesis:  
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55 H8: Absorption is positively associated with metaverse usage intensity.  
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Prior studies have also suggested that customers are likely to use immersive technologies frequently and intensively when they are emotionally engaged with virtual-mediated content. For example, Leung *et al.* (2022) found that passionate customers spend more time in VR-mediated tourism environments because these activities contribute to a positive mood. Suh (2023) found that customers are more likely to use the metaverse frequently and intensively when metaverse-mediated activities are considered exciting and enjoyable. Given the above, we propose that customers' positive emotions drive their metaverse usage, leading to the following hypothesis:

H9: Affection is positively associated with metaverse usage intensity.

Furthermore, recent studies have also demonstrated the importance of customer participation in driving their intensity in using virtual platforms. For instance, Rodríguez-Ardura *et al.* (2023) found that customers use social commerce platforms more frequently when they enjoy sharing their ideas and opinions with peers, indicating that participative behaviours drive stickiness. In the context of the metaverse, Mogaji *et al.* (2023) argued that customers are willing to prolong their immersive time when they enjoy participating in novelty-seeking activities in metaverse-mediated environments. Based on the above discussion, we propose that customer participation significantly drives their metaverse usage intensity, as indicated by their frequency, duration, and recency of event involvement in metaverse-mediated environments, leading to the following hypothesis:

H10: Participation is positively associated with metaverse usage intensity.

Based on the customer engagement framework in the metaverse, highly engaged customers are likely to behave positively in the metaverse and physical world (Ahn *et al.*, 2022; Gursoy *et al.*, 2022). As such, we also argue that customer engagement dimensions play considerable roles in driving customers' future visit intentions. Prior studies have suggested that customers are likely to physically visit a destination when they are immersed and deeply engrossed in virtual-mediated participative activities related to the destination. For example,

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3 Kim *et al.* (2020) found the importance of customers' flow experiences in VR-based tourism  
4 activities in driving their future visit intentions. Atzeni *et al.* (2022) showed that highly engaged  
5 customers are immersed and deeply involved in heritage-related VR tourism activities, which  
6 increases their intention to physically visit the focal heritage destination. Based on the above,  
7 we suggest that immersive metaverse experiences enhance customers' future visit intentions,  
8 leading to the following hypothesis:  
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14 H11: Absorption is positively associated with future visit intention.  
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20 Prior studies have also confirmed that customers are willing to physically visit a  
21 destination when they are emotionally attached to virtual-mediated destinations. For example,  
22 Leung *et al.* (2022) found that customers are willing to physically visit the focal destination  
23 when they enjoy participating in VR tourism activities. Lavuri and Akram (2023) found the  
24 importance of customers' emotional involvement and enjoyment in VR tourism activities in  
25 driving their future visit intention. Based on the aforementioned, customers' emotional  
26 engagement with the metaverse is likely to be influential in facilitating their future visit  
27 intentions, leading to the following hypothesis:  
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36 H12: Affection is positively associated with future visit intention.  
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42 Prior studies have also suggested a positive relationship between customers' participative  
43 behaviours in virtual-mediated environments and their future visit intentions. Hollebeek *et al.*  
44 (2020) argued that customers' social investment positively influences their behavioural  
45 intentions, indicating that active participation in VR activities, such as decorating avatars and  
46 engaging with peers, increases the likelihood of physical visits to desired destinations. Jung *et al.*  
47 (2023) found that interactivity supported by immersive technologies is influential in driving  
48 customers' participation in virtual-mediated destinations, which in turn drives their intention  
49 to visit the physical destination in the future. In line with these viewpoints, we posit that  
50 customers are willing to physically participate in events after engaging with their virtual  
51 representations in metaverse-mediated environments, leading to the following hypotheses:  
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3 H13: Participation is positively associated with future visit intention.  
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8 As metaverse-related research is still in its infancy, the relationship between customers'  
9 metaverse usage intensity and future visit intention remains a matter of debate. While some  
10 scholars have argued that some of the real-world events and visits are likely to be substituted  
11 by metaverse-mediated events (Gursoy *et al.*, 2022), an alternative perspective contends that  
12 metaverse-mediated events and activities provide trial experiences for customers, motivating  
13 them to participate in real-world events (Buhalis *et al.*, 2023). In this study, we adopt this  
14 alternative perspective, suggesting that customers' metaverse usage intensity is positively  
15 related to future visit intention. The reason is that MICE activities require marketers and  
16 organisers to provide customers with sensory experiences (e.g., hearing, touching, tasting and  
17 smelling) to experience the highlights and features of different contextual environments in the  
18 real world, which is difficult to fully replicate given the current state of the metaverse (Buhalis,  
19 Lin, *et al.*, 2022; Wong *et al.*, 2023). However, it is reasonable to argue that metaverse-  
20 mediated MICE activities provide opportunities for customers to interact with different actors  
21 enabling them to have a trial experience and then induce actual visits (Flavián *et al.*, 2019).  
22 Thus, we hypothesise:  
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37 H14: Metaverse usage intensity is positively associated with future visit intention.  
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42 Research has shown the mechanism that facilitates highly engaged customers' positive  
43 behavioural intentions both within and beyond the virtual setting (Cheung *et al.*, 2015; Leung  
44 *et al.*, 2022). Cheung *et al.* (2015) found that highly engaged customers are absorbed and  
45 deeply engrossed in online games, leading them to play frequently and intensively, thereby  
46 increasing in-game purchases. Similarly, Leung *et al.* (2022) discovered that emotionally  
47 engaged customers spend more time in VR tourism environments, boosting their future visit  
48 intentions, thereby suggesting that VR stickiness mediates the impact of positive mood on  
49 future visit intentions. Moreover, Mogaji *et al.* (2023) argued that prolonged immersive time  
50 spent on the metaverse strengthens highly participative customers to behave positively (e.g.,  
51 purchase and visit) in the physical world. Considering this, it can be argued that metaverse  
52 usage intensity mediates the impact of customer engagement dimensions on future visit  
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intention, indicating that metaverse usage intensity is a necessary antecedent for highly engaged customers to visit or participate in real-world events in the future. Thus, the following hypotheses are proposed.

H15: Metaverse usage intensity mediates the impact of (a) absorption, (b) affection and (c) participation on future visit intention.

#### 4. Research methodology

##### 4.1. Data collection

We adopted a purposive sampling approach to collect data from respondents who had experience using VR technologies to engage with metaverse-mediated environments to obtain information on or participate in activities related to MICE industries in Hong Kong. People who had participated in MICE activities hosted in metaverse-mediated environments, such as Spatial, Decentraland, Sandbox, Innerworld and Roblox, were invited to participate in the online survey. Respondents with no experience of using VR technologies to engage with MICE activities in metaverse-mediated environments were excluded, thereby guaranteeing the relevance of the respondents. Before the start of the survey, the respondents were asked to recall metaverse-mediated events they had attended, such as the types of events (e.g., exhibitions, concerts and conferences etc.), metaverse platforms and interactions involved (e.g., body movements, text messages, emojis, videos and voice messages). During the survey, the respondents were asked to answer questions based on their most familiar metaverse-mediated environment (referred to as 'this metaverse' in the questionnaire).

We rejected 85 responses indicating a lack of experience with using VR technologies to participate in MICE activities in metaverse-mediated environments. After further eliminating 68 incomplete surveys, 267 valid responses were retained for data analysis. *Appendix 1* presents the demographic characteristics of respondents.

##### 4.2. Measurement items

We adapted measurement items from previous studies to measure the constructs in our theoretical model using 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). Media richness was operationalised as a multidimensional construct comprising four dimensions: personal focus, immediate feedback, multiple cues and language variety. Each of these

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3 dimensions was measured by three items adapted from Tseng *et al.* (2022). Perceived  
4 metaverse realism was measured by five items adapted from Ribbens *et al.* (2016) and Daassi  
5 and Debbabi (2021). Customer engagement was conceptualised as psychological engagement  
6 and behavioural engagement. Psychological engagement referred to absorption and affection,  
7 each was measured using three items adapted from Harrigan *et al.* (2017). Behavioural  
8 engagement referred to participation and was measured using four items adapted from Ndhlovu  
9 and Maree (2022). Future visit intention was measured by three items adapted from Leung *et*  
10 *al.* (2022). Last, metaverse usage intensity was measured by three items covering duration,  
11 frequency and recency adapted from Cheung *et al.* (2015). The measurement items were pre-  
12 tested by three IS professors and six experienced metaverse users to ensure consistency of  
13 meaning. Modifications to the questionnaire were made to fit the metaverse context after  
14 conducting the pre-test.  
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## 28 **5. Results**

### 29 **5.1. Common method bias**

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32 Common method bias (CMB) may overstate the magnitude of relationships between the  
33 constructs in the research model, given the use of self-reported data from a single source.  
34 Therefore, we assessed the CMB by examining the correlation among all the constructs in our  
35 research model. The results revealed that the constructs' correlation was less than 0.9,  
36 suggesting that CMB is not a concern (Hair *et al.*, 2017). Furthermore, we added an unrelated  
37 marker variable to the research model to examine the CMB. We then compared the changes in  
38 the R<sup>2</sup> values of the endogenous constructs before and after adding the marker variable. For  
39 metaverse usage intensity, the R<sup>2</sup> value changed from .545 to .548, and for future visit intention,  
40 from .699 to .701. As the differences in R<sup>2</sup> value were insignificant ( $\leq .10$ ), we can confirm  
41 that the questionnaire was not affected by CMB (Lindell and Whitney, 2001).  
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### 52 **5.2. Measurement model results**

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54 We used partial least squares–structural equation modelling (PLS-SEM) to analyse the  
55 collected data. We assessed the measurement items' factor loadings, composite reliability, and  
56 Average Variance Extracted (AVE) to assess the reliability and convergent validity of the  
57 constructs (See *Table 1*). The results revealed that the factor loadings of all measurement items  
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3 exceeded 0.7, whilst the composite reliability of all constructs exceeded the recommended  
4 threshold of 0.7. The AVE for all constructs exceeded the recommended threshold of 0.5, thus  
5 confirming convergent validity (Hair *et al.*, 2017). Furthermore, we also assessed the  
6 discriminant validity of the measurement model by using the Heterotrait–Monotrait (HTMT)  
7 ratio criterion (Henseler *et al.*, 2016), and found all HTMT values lower than the recommended  
8 value of 0.9 (See **Table 2**), confirming the discriminant validity.  
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### 25 **5.3. Structural model results**

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27 We assessed the model fit for the research model using the standardized root mean square  
28 residual (SRMR). The results revealed that the SRMR value was .069, lower than the  
29 recommended value of .080 (Benitez *et al.*, 2020), and hence the model fit is confirmed.  
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33 Additionally, we assessed the research model's predictive relevance ( $Q^2$ ) using the  
34 blindfolding procedure (Shmueli *et al.*, 2019). Results showed  $Q^2$  values exceeding zero for  
35 perceived realism ( $Q^2 = .403$ ), absorption ( $Q^2 = .276$ ), affection ( $Q^2 = .300$ ), participation ( $Q^2$   
36  $= .311$ ), metaverse usage intensity ( $Q^2 = .306$ ), and future visit intention ( $Q^2 = .618$ ), indicating  
37 satisfactory predictive relevance. Furthermore, we examined the model's predictive power  
38 using PLS-predict, evaluating prediction error statistics and root mean square error (RMSE)  
39 for all measurement indicators. **Appendix 2** displays the results, indicating that for most  
40 indicators, RMSE values in the PLS-SEM model were lower than in the linear regression model  
41 (LM model), and suggesting moderate predictive power. Overall, the blindfolding procedure  
42 and PLS-predict assessment confirmed the research model's predictive capability.  
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52 The explanatory power of the research model was evaluated by the coefficient of  
53 determination,  $R^2$  values (See **Appendix 3**). The  $R^2$  values were .666 for perceived metaverse  
54 realism, .356 for absorption, .350 for affection, .373 for participation, .545 for metaverse usage  
55 intensity, and .699 for future visit intention. The results suggest that the exogenous constructs  
56 in the research model adequately explain a meaningful amount of variation in the endogenous  
57 constructs.  
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We examined the hypotheses by checking the standardised coefficient beta values and adjusted p-values based on the Benjamini-Hochberg False Discovery Rate (FDR) control procedure (Benjamini and Hochberg, 1995) to determine the statistical significance of our hypotheses. The false discovery rate was set at 0.05. As presented in *Appendix 3*, we included age, education, gender, and income as control variables. The results revealed that age and education significantly impact only metaverse usage intensity, and the remaining paths were insignificant.

With the control variables, the results supported 15 of the 17 hypotheses (See *Figure 1* and *Appendix 3*). Regarding the relationships between media richness dimensions and perceived metaverse realism, the impact of multiple cues ( $\beta = .480$ ,  $p = .000$ ) on perceived metaverse realism was the strongest, followed by personal focus ( $\beta = .259$ ,  $p = .000$ ) and immediate feedback ( $\beta = .178$ ,  $p = .042$ ), confirming H1, H2, and H3. However, the relationship between language variety and perceived metaverse realism was not significant ( $\beta = .004$ ,  $p = .958$ ), and hence H4 was rejected. In addition, perceived metaverse realism has significant positive effects on absorption ( $\beta = .598$ ,  $p = .000$ ), affection ( $\beta = .594$ ,  $p = .000$ ) and participation ( $\beta = .612$ ,  $p = .000$ ), confirming H5, H6, and H7.

Regarding the consequences of customer engagement dimensions, the impact of participation ( $\beta = .369$ ,  $p = .000$ ) on metaverse usage intensity was the strongest, followed by affection ( $\beta = .206$ ,  $p = .013$ ) and absorption ( $\beta = .135$ ,  $p = .042$ ), confirming H8, H9, and H10. Relatedly, the impact of participation ( $\beta = .359$ ,  $p = .000$ ) on future visit intention was the strongest, followed by affection ( $\beta = .215$ ,  $p = .028$ ), supporting H12 and H13. In contrast, the impact of absorption ( $\beta = .078$ ,  $p = .237$ ) on future visit intention was not significant, hence H11 was rejected. Lastly, we found that metaverse usage intensity significantly affects future visit intention ( $\beta = .275$ ,  $p = .000$ ), and hence H14 was supported.

Following the mediation-testing procedure as suggested by Hair *et al.* (2017), we found that the indirect effects of affection ( $\beta = .057$ ,  $p = .012$ ) and participation ( $\beta = .102$ ,  $p = .001$ ) on future visit intention through metaverse usage intensity were significant. Given the significant direct effect of affection and participation on future visit intention, it can be concluded that metaverse usage intensity partially mediates the impact of affection and participation on future visit intention. Hence, H15b and H15c were partially supported. We also found a full-mediation effect for metaverse usage intensity in the relationship between absorption and future visit intention. The indirect effect of absorption on future visit intention

through metaverse usage intensity was positive and significant ( $\beta = .037, p = .038$ ). However, the direct effect of absorption on future visit intention ( $\beta = .078, p = .237$ ) was weak and not significant; thus, metaverse usage intensity fully mediates the impact of absorption on future visit intention (Hair *et al.*, 2017) supporting H15a.

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#### 5.4. Post-hoc analysis with fuzzy set qualitative comparative analysis (fsQCA)

To add further insights into the PLS-SEM findings, the adoption of fsQCA is warranted. Integrating PLS-SEM with fsQCA presents a promising approach that combines symmetric and asymmetric perspectives simultaneously. This enables the identification of behavioural patterns that may not be evident through a single method, due to the singular reasoning involved. The details of the procedure and results were presented in *Appendix 4 and 5*, respectively.

We interpreted the intermediate, instead of complex and parsimonious output because it maintains a balance between comprehensiveness and interpretability by concentrating on important configurations (Pappas and Woodside, 2021). As demonstrated in *Appendix 5*, the fsQCA findings present sufficient configurations with acceptable consistency ( $> .80$ ) and coverage ( $> .20$ ) that yield high visiting intention. In fsQCA, the term "consistency" quantifies the degree to which cases possessing a specific configuration result in the same outcome. High consistency suggests the configurations can consistently generate the same outcome, analogous to correlation in the regression method. Conversely, "coverage" indicates the empirical significance of a given configuration. This metric evaluates the proportion of the outcome that is attributable to the configuration, akin to the variance explained in the regression method. As the consistency and coverage values are above the threshold, it implies sufficient relevant empirical evidence yielded by the configuration, and a significant proportion of the targeted outcome (visit intention) can be attributed to the configurations (Pappas and Woodside, 2021). Three configurations were generated. The first configuration indicates that the presence of perceived realism, multiple cues, language variety, immediate feedback, personal focus, absorption, affection, and participation can lead to high visit intention, particularly for male consumers. The second configuration yields a similar combination, with the only difference in adding metaverse usage intensity as a condition. The configuration is not bounded by gender

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3 and age. The third configuration highlights that for the young female group, the presence of  
4 perceived realism, multiple cues, language variety, immediate feedback, personal focus,  
5 affection, and participation, with the absence of metaverse usage intensity is important in  
6 fostering visit intention.  
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## 10 11 12 13 **6. Discussion of key findings**

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15 The results showed that perceived metaverse realism was driven by three dimensions of media  
16 richness: multiple cues, immediate feedback and personal focus. These findings align with  
17 prior research on media richness, indicating that rich media content fosters multisensory  
18 experiences and promotes interactions among users, fostering a sense of human warmth and  
19 enabling sharing and realistic experiences in the metaverse (Tseng and Wei, 2020; Tseng *et*  
20 *al.*, 2022). However, the influence of language variety on perceived metaverse realism was  
21 negligible, suggesting that the richness and diversity of languages and symbols may be of lesser  
22 importance in assessing metaverse authenticity. This discrepancy may stem from customers'  
23 tendency to control their avatars in virtual environments using nonverbal cues such as facial  
24 expressions, body language, gestures, and postures to communicate with others. Additionally,  
25 as metaverse technologies are still in their early stages, most respondents were early adopters  
26 with limited experience in metaverse-mediated environments. They were more inclined to  
27 respond to marketer-driven events by controlling their avatars and using nonverbal cues, rather  
28 than text and symbols, to communicate with others. Therefore, we propose that metaverse-  
29 mediated environments are perceived as realistic and authentic when customers can manipulate  
30 personalised avatars to convey personal emotions through various cues in real time.  
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44 In addition, our results revealed the effects of perceived metaverse realism on the  
45 dimensions of customer engagement, namely absorption, affection and participation, which is  
46 consistent with previous findings (Daassi and Debbabi, 2021; Daneels *et al.*, 2018; Kim *et al.*,  
47 2020). The results suggest that customers are likely to be absorbed and deeply engrossed in  
48 authentic virtual environments to experience realistic events and be enthusiastic about  
49 participating in activities, social interactions and knowledge exchange.  
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55 Furthermore, our results indicate a positive association between dimensions of customer  
56 engagement and their intensity of metaverse usage. Consistent with previous research on  
57 customer engagement, when customers become absorbed and deeply involved in metaverse  
58 environments, they tend to spend more time participating in events and activities (Ahn *et al.*,  
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2022; Suh, 2023). Immersed in virtual worlds, customers often lose track of time and actively engage in various activities, expending significant time, energy, and effort (Cheung *et al.*, 2015). Additionally, our findings show that affection and participation significantly influence customers' future visit intention, supporting the idea that enjoyment and involvement in virtual environments affect actual visitation (Leung *et al.*, 2022). This empirical evidence demonstrates how authentic and immersive experiences in metaverse environments drive positive customer behaviours both within and outside the metaverse.

Our findings provide empirical support for the argument that the frequency and intensity of participation in metaverse-mediated events drive customers' future visit intention. We also found that metaverse usage intensity fully mediated the relationship between absorption and future visit intention, suggesting that highly absorbed customers are not likely to visit the focal event if their metaverse usage intensity is low. In other words, prolonged immersive time spent on the metaverse is influential in strengthening highly immersed customers to behave positively in the physical world (Mogaji *et al.*, 2023). Thus, metaverse-mediated events should not be viewed as substitutes for real-world events but as meaningful trial experiences or pre-visit experiences that increase customers' future visit intention.

The fsQCA revealed interesting non-linear results. First, the finding indicates a gender-based configuration that leads to visit intention. To be specific, for male customers, it has been shown that metaverse attributes are not sufficient on their own to foster high event visit intention, but we argue that incorporating them together is necessary to enhance the overall user experiences, making the event more relatable and accessible. Echoing the PLS-SEM finding, in the presence of perceived realism, multiple cues, language variety, immediate feedback, personal focus, absorption, affection, and participation, the customer experience is enhanced, and this amalgamation amplifies an event's overall appeal and fosters greater interest in visiting the event. Research indicates that different perceptual preferences and interactions exist in males and females regarding interactive immersion (Olya *et al.*, 2020). Evidently, male customers tend to exhibit greater continuous involvement with platforms that apply virtual reality and other cutting-edge technologies in the metaverse (Xu *et al.*, 2023). It can be resonated that males are typically observed participating more frequently in spatial activities and are exposed to a greater degree of "spatial experiences" compared to females, and thus more likely to appreciate metaverse cues and virtual experiences (Aw *et al.*, 2023).



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3 The second configuration suggests a similar combination of causal conditions as the first  
4 configuration, with metaverse usage intensity added. The presence of metaverse usage intensity  
5 here supports the PLS-SEM finding. This can be attributed to the fact that intensive metaverse  
6 usage profoundly influences customers' perceptions and convictions about the authentic event  
7 by solidifying comprehensive schema representations within their memory (Mogaji *et al.*,  
8 2023). These resilient cognitive frameworks are important in prompting the anticipation and  
9 craving of experiences toward the physical event.

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16 The third configuration is segmented by gender (female) and age (young). Within young  
17 female group, the presence of perceived realism, multiple cues, language variety, immediate  
18 feedback, personal focus, affection, and participation, coupled with the absence of metaverse  
19 usage intensity, foster visit intention. The absence of metaverse usage intensity contradicts the  
20 PLS-SEM finding that demonstrates a positive effect. One can conjecture that the ground-  
21 breaking yet demanding aspect of the metaverse can potentially lead to mental fatigue with  
22 excessive use. Notably, young women, who are in a phase of speedy social and biological  
23 maturation, may be more susceptible to mental oversaturation. The continuous and intense  
24 engagement may prompt feelings of being overwhelmed or digital fatigue, detracting  
25 consumers from the allure of virtual experiences. This finding encourages further reflection on  
26 the principles of feelings-as-information theory (Schwarz, 2012), highlighting the importance  
27 of engaging consumers' senses using visual, auditory, tactile, olfactory and gustatory stimuli.  
28 However, an excessive amount of sensory information and experiences in the metaverse may  
29 have adverse effects (Tan *et al.*, 2023). Overall, the intriguing findings uncovered imply that  
30 while intensive metaverse usage may enhance real-world activities (future visit intention),  
31 specific demographics, combined with other metaverse attributes and experience factors, may  
32 exhibit varied configurations leading to the same outcome (future visit intention) without high  
33 metaverse usage intensity.

## 50 **7. Conclusion and implications**

### 51 **7.1. Conclusion**

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54 The metaverse, a cornerstone of Web 3.0, is set to revolutionise customer experiences in  
55 tourism and hospitality. Yet, research on customer engagement within metaverse-mediated  
56 environments remains nascent. To address this, we developed and validated a framework  
57 rooted in media richness, perceived realism, and customer engagement. Our study explores  
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3 how these factors influence business success in the MICE context (metaverse usage intensity  
4 and future visit intention). We found that dimensions of media richness like multiple cues,  
5 immediate feedback, and personal focus drive perceived realism, which in turn fosters  
6 customer engagement (absorption, affection, and participation), leading to increased metaverse  
7 usage and future visit intentions. These findings provide meaningful implications for both  
8 scholars and marketers.  
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## 17 **7.2. Theoretical implications**

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19 This study empirically demonstrates the customer engagement journey in the metaverse and  
20 highlights the potential of rich media content to create authentic experiences in metaverse-  
21 mediated environments. By integrating theoretical perspectives of media richness, perceived  
22 realism, and customer engagement, our research provides a comprehensive framework for  
23 understanding the mechanisms driving customer engagement in the metaverse and its impact  
24 on positive customer behaviours both within and outside the metaverse.  
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30 While previous studies have explored customers' metaverse adoption based on  
31 conventional theories, this study provides an additional perspective by examining engagement  
32 in the metaverse to understand customer behaviours in and out of the metaverse (Ahn *et al.*,  
33 2022; Buhalis, Lin, *et al.*, 2022). Specifically, this study conceptualises and operationalises  
34 customer engagement in the metaverse context, suggesting absorption, affection, and  
35 participation as key dimensions that reflect the characteristics of highly engaged customers in  
36 a metaverse-mediated environment. Accordingly, this study provides insight into the theory of  
37 customer engagement by identifying the characteristics of highly engaged customers in the  
38 context of the metaverse, considering participation and affection as key dimensions in driving  
39 customers' metaverse usage intensity and future visit intention, which offers avenues for  
40 further research on customer engagement in the metaverse.  
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49 Although MRT has been suggested as a suitable framework for investigating customers'  
50 experiences in the metaverse (Mladenović *et al.*, 2023), empirical studies on the significance  
51 of MRT dimensions in enhancing customer engagement remain scarce. While prior research  
52 has explored the role of media richness in various contexts such as mobile media behaviours  
53 (Tseng and Wei, 2020), social identity in online communities (Shen *et al.*, 2021), and  
54 interactivity in online games (Tseng *et al.*, 2022), our study contributes novel insights to  
55 tourism marketing by illustrating how media richness dimensions create multisensory  
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3 experiences and real-time interactions, fostering perceived metaverse realism and customer  
4 engagement. This study extends MRT by showcasing how its dimensions facilitate authentic  
5 trial experiences, encouraging customers to engage consistently with metaverse-mediated  
6 events using rich media content.  
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11 Furthermore, our study sheds light on the debate surrounding whether the metaverse is a  
12 substitute or complement to attending real-world MICE events. While it has been suggested  
13 that the metaverse has the potential to revolutionise customer experiences by creating realistic  
14 virtual activities that can substitute actual visits (Buhalis *et al.*, 2023), our findings suggest that  
15 metaverse-mediated experiences can be seen as complementary to, rather than substitutes for  
16 real-world events.  
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22 From a methodology point of view, the non-linear approach using fsQCA contributes to  
23 hospitality and destination marketing in the metaverse by identifying the causal configuration  
24 of attributes that underpin successful marketing in the metaverse (Olya *et al.*, 2020). Having  
25 adopted a multi-method approach, the key takeaway of our study is that effective hospitality  
26 and destination marketing in the metaverse requires not only identifying a single best model  
27 but also the combination of different metaverse attributes and metaverse usage intensity (*See*  
28 *Appendix 4 and 5*). It is crucial to note that the incorporation of gender and age in the causative  
29 model leads to the discovery of gender-specific combinations, paving the way for future  
30 research on how an array of metaverse attributes and experiential factor interdependencies are  
31 implemented and interact.  
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### 41 **7.3. Managerial implications**

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43 Based on this study's findings, marketers and developers should invest more resources in  
44 enhancing customer engagement in the metaverse to increase usage intensity and actual  
45 visitation. To create authentic metaverse experiences, they should focus on developing rich  
46 media content and enabling multiple communication cues, personalised feedback, and  
47 immediate feedback during metaverse events. For instance, allowing customers to use verbal  
48 and nonverbal cues through their avatars and incorporating non-player characters as hosts can  
49 enhance real-time communication.  
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57 Furthermore, marketers and developers should prioritise verisimilar content and realistic  
58 events that bridge the virtual and physical worlds. Events such as concerts and exhibitions  
59 spanning centuries and locations can deepen customer engagement and evoke positive  
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3 emotions. Importantly, metaverse usage intensity correlates with future event participation,  
4 suggesting the need to incentivise customers to spend more time in the metaverse. Loyalty  
5 rewards and professional interaction strategies can cultivate a sense of belonging and  
6 encourage frequent and intensive participation, ultimately driving future visit intention.  
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11 The fsQCA results offer a nuanced perspective, suggesting a segment-focused approach.  
12 For male consumers, practitioners should highlight the realism and interactivity of the  
13 metaverse experience, alongside other metaverse attributes, to boost physical event visitation.  
14 However, a universal strategy, regardless of age and gender, should prioritise metaverse usage  
15 intensity alongside other experiential attributes. Conversely, targeting young female consumers  
16 with low metaverse usage intensity requires a focus on optimising the metaverse experience  
17 rather than increasing usage, which could potentially be counterproductive if overdone.  
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## 26 **8. Limitations and future research directions**

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28 While this study offers significant insights, it comes with limitations. Firstly, the cross-  
29 sectional survey data limits generalisability as it reflects early adopters' perspectives, urging  
30 the need for longitudinal research. Secondly, the findings of this study were based on  
31 respondents' most familiar metaverse-mediated MICE experiences, overlooking the  
32 differences in metaverse-mediated environments and MICE activities. Thus, future research  
33 could compare and contrast customers' perceptions of metaverse-mediated MICE activities in  
34 controlled settings to enhance the understanding of customers' perceptions in different settings.  
35 Thirdly, while examining perceived realism's role, the model could benefit from additional  
36 moderators such as personal innovativeness and social influence. Lastly, focusing solely on  
37 tourism and events in the metaverse, future research could explore customer engagement across  
38 various contexts like retail, gaming, and healthcare environments for a broader understanding.  
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**Table 1. Results of measurement model**

Construct	Loading	Alpha	Composite reliability	AVE
<b>Media richness – Personal focus</b>		<b>.877</b>	<b>.925</b>	<b>.803</b>
While using this metaverse, I can create personalized virtual avatars.	.931			
While using this metaverse, I can edit personal profiles and decorate my virtual avatars.	.899			
While using the metaverse, I can share my personal feelings using my personalized virtual avatars.	.857			
<b>Media richness – Immediate feedback</b>		<b>.887</b>	<b>.930</b>	<b>.816</b>
While using this metaverse, I can send/ receive information quickly.	.888			
It does not take long to express my responses to others while using this metaverse.	.912			
I can receive timely feedback from others while using this metaverse.	.910			
<b>Media richness – Language variety</b>		<b>.919</b>	<b>.949</b>	<b>.861</b>
While using this metaverse, I can use a large pool of language symbols/ emoticons to communicate.	.940			
While using this metaverse, I can use varied symbols (e.g., texts, photos, videos, audios and links etc.) to express my ideas.	.933			
While using this metaverse, I can use rich and varied language, along with non-word sounds to express exactly what I mean to say.	.910			
<b>Media richness – Multiple cues</b>		<b>.887</b>	<b>.930</b>	<b>.815</b>
While using this metaverse, I can convey multiple types of information (verbal and nonverbal).	.906			
While using this metaverse, I can communicate with others through verbal means (e.g., spoken words, texts, voice, and video chats).	.897			
While using this metaverse, I can present vivid information using nonverbal expressions (e.g., facial expression, body language and distancing).	.905			
<b>Perceived realism</b>		<b>.846</b>	<b>.890</b>	<b>.618</b>
While using this metaverse, I felt like my avatar was present in the metaverse environment.	.846			
In this metaverse, everything looked impressive.	.761			
The interactions the avatars had in this metaverse were similar to interactions people have in real life.	.752			
By using this metaverse, I can learn something about the real world.	.771			
While using this metaverse, I felt I determined the course of my experience.	.796			

**Table 1. Results of measurement model (continued)**

Construct	Loading	Alpha	Composite reliability	AVE
<b>Customer engagement - Absorption</b>		<b>.909</b>	<b>.936</b>	<b>.786</b>
Time flies when I am using with this metaverse.	.878			
While I am using this metaverse, I get carried away.	.871			
While I am using this metaverse, I forget everything else around me.	.911			
While I am using this metaverse, I am usually absorbed.	.885			
<b>Customer engagement – Affection</b>		<b>.947</b>	<b>.962</b>	<b>.863</b>
I feel excited when I use this metaverse.	.914			
I am passionate about this metaverse.	.929			
I am enthusiastic about this metaverse.	.937			
I love this metaverse.	.935			
<b>Customer engagement – Participation</b>		<b>.938</b>	<b>.955</b>	<b>.843</b>
I exchange ideas with other people about this metaverse.	.910			
I often participate in activities organized by this metaverse.	.917			
I like to get involved in this metaverse.	.935			
I enjoy interacting with others in this metaverse.	.909			
<b>Future visit intention</b>		<b>.938</b>	<b>.961</b>	<b>.890</b>
In the next 3 months, I will plan to visit the event that I experienced in this metaverse.	.948			
In the next 3 months, I will visit the event that I experienced in this metaverse in the near future.	.951			
In the next 3 months, I will invest money and time to visit the event that I experienced in this metaverse.	.932			
<b>Metaverse usage intensity</b>		<b>.756</b>	<b>.847</b>	<b>.648</b>
In the past month, how long have you stayed in this metaverse per visit on average?	.789			
In the past month, how many times have you visited this metaverse per week on average?	.788			
How long ago was your most recent visit in this metaverse?	.837			

**Table 2. Discriminant validity: based on HTMT ratio**

	ABS	AFF	IF	LV	MU	MC	PART	PMR	PF	FVI
ABS										
AFF	.749									
IF	.667	.616								
LV	.545	.539	.830							
MU	.679	.745	.446	.340						
MC	.526	.490	.735	.687	.353					
PART	.784	.875	.629	.531	.756	.533				
PMR	.666	.651	.773	.697	.455	.883	.676			
PF	.758	.673	.801	.769	.442	.733	.714	.803		
FVI	.713	.802	.488	.365	.788	.374	.840	.521	.561	

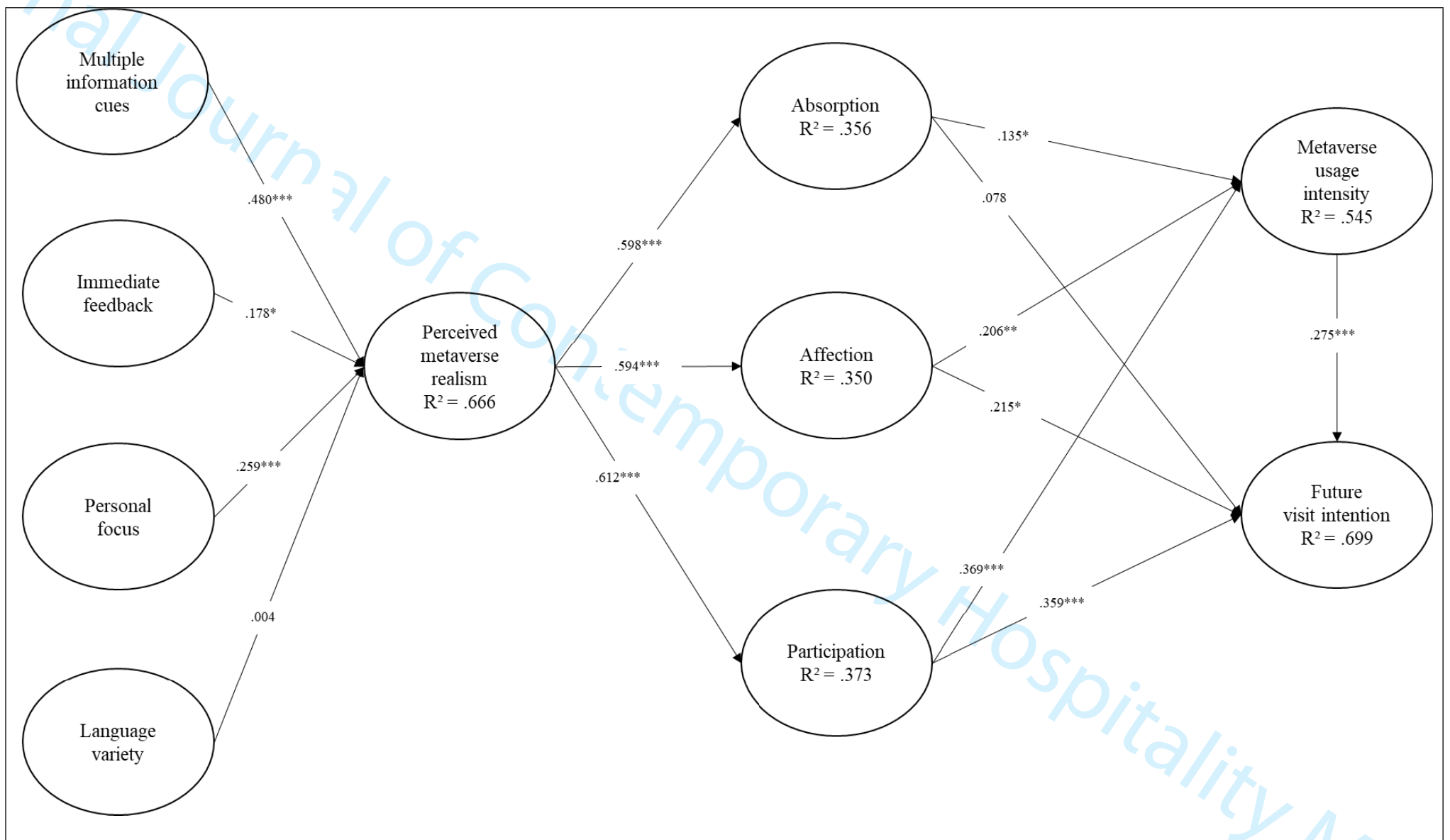
*Note: HTMT values < 0.90 indicate a satisfactory result for discriminant validity (Hair et al. 2017), ABS = Absorption, AFF = Affection, IF = Immediate feedback, LV = Language variety, MU = Metaverse usage intensity, MC = Multiple cues, PART = Participation, PMR = Perceived metaverse realism, PF = Personal focus, FVI = Future visit intention*

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Figure 1. Research model.



Note: \*Path significant at the .050 level. \*\*Path significant at the .001 level. \*\*\*Path significant at the .000 level.

### Appendix 1. Demographic characteristics of respondents

Variables	Description	(%)	Variables	Description	(%)
Gender	Female	61.0	Experience in using social media platforms	Less than 1 month	0.0
	Male	39.0		1 – 5 months	0.0
Age	18 -20 years old	23.2		6 – 11 months	7.9
	21 - 23 years old	54.3		12 – 24 months	19.1
	24 - 26 years old	5.6		25 months or above	73.0
	27 - 29 years old	4.5	Experience in using the metaverse	1 – 4 weeks	43.1
	30 – 32 years old	4.5		5 – 8 weeks	37.8
	33 – 35 years old	4.5		9 – 12 weeks	6.7
	36 – 38 years old	1.5		13 – 16 weeks	9.0
	39 – 41 years old	1.1		17 weeks or above	3.4
	41 – 43 years old	0.0			
	43 – 45 years old	0.0			
45 years old or above	0.7				
Education	Primary	0.7	Time spent on metaverse (last 3 months)	1 - 10 minutes	55.8
	Secondary	0.7		11 - 20 minutes	28.8
	Tertiary	8.6		21 - 30 minutes	9.0
	Bachelor's degree	76.8		31 - 40 minutes	6.0
	Master's degree or above	13.1		41 - 50 minutes	0.4
Social media usage (per day)	Rarely	9.7	Experience in using XR	1 – 5 times	70.8
	Once daily	7.1		6 – 10 times	10.5
	2 - 5 times	15.7		11 – 15 times	10.1
	6 - 10 times	15.0		16 – 20 times	6.4
	More than 10 times	52.4		21 times or above	2.2

## Appendix 2. PLS-predict results

Items	PLS-SEM		LM-RMSE	PLS-SEM-LM-RMSE
	RMSE	Q <sup>2</sup> predict		
ABS1	1.266	0.265	1.176	0.090
ABS2	1.070	0.360	1.077	-0.007
ABS3	1.338	0.234	1.293	0.045
ABS4	1.194	0.271	1.171	0.023
AFF1	1.143	0.315	1.16	-0.017
AFF2	1.188	0.237	1.252	-0.064
AFF3	1.233	0.269	1.227	0.006
AFF4	1.238	0.286	1.252	-0.014
MU1	1.621	0.047	1.674	-0.053
MU2	1.520	0.031	1.567	-0.047
MU3	1.513	0.181	1.453	0.060
PART1	1.281	0.277	1.276	0.005
PART2	1.214	0.297	1.256	-0.042
PART3	1.242	0.326	1.244	-0.002
PART4	1.281	0.301	1.265	0.016
PMR1	0.970	0.446	1.016	-0.046
PMR2	1.149	0.328	1.172	-0.023
PMR3	1.071	0.348	1.105	-0.034
PMR4	1.025	0.428	1.054	-0.029
PMR5	1.047	0.435	1.125	-0.078
FVI1	1.548	0.179	1.561	-0.013
FVI2	1.488	0.209	1.477	0.011
FVI3	1.494	0.163	1.497	-0.003

Note: PMR = Perceived metaverse realism, ABS = Absorption, AFF = Affection, PART = Participation, MU = Metaverse usage intensity, FVI = Future visit intention

### Appendix 3. Results of PLS-SEM structural model

Relationship	$\beta$	p-value	Adjusted p-value*	R <sup>2</sup>
Perceived metaverse realism				
Multiple cues → perceived metaverse realism	.480	.000***	.000***	.666
Immediate feedback → perceived metaverse realism	.178	.027*	.042*	
Personal focus → perceived metaverse realism	.259	.000***	.000***	
Language variety → perceived metaverse realism	.004	.946	.958	
Absorption				
Perceived metaverse realism → absorption	.598	.000***	.000***	.356
Affection				
Perceived metaverse realism → affection	.594	.000***	.000***	.350
Participation				
Perceived metaverse realism → participation	.612	.000***	.000***	.373
Metaverse usage intensity				
Absorption → metaverse usage intensity	.135	.025*	.042*	.545
Affection → metaverse usage intensity	.206	.006**	.013*	
Participation → metaverse usage intensity	.369	.000***	.000***	
Future visit intention				
Absorption → future visit intention	.078	.172	.237	.699
Affection → future visit intention	.215	.015*	.028*	
Participation → future visit intention	.359	.000***	.000***	
Metaverse usage intensity → future visit intention	.275	.000***	.000***	
Age → metaverse usage intensity	.170	.004**	.010**	---
Education → metaverse usage intensity	.108	.015*	.028*	---
Gender → metaverse usage intensity	.006	.884	.958	---
Income → metaverse usage intensity	.059	.112	.164	---
Age → future visit intention	-.002	.958	.958	---
Education → future visit intention	.044	.204	.264	---
Gender → future visit intention	-.005	.875	.958	---
Income → future visit intention	-.026	.486	.594	---

\*Note: The adjusted p-value is based on the Benjamini-Hochberg FDR control procedure

\*Path significant at the .050 level. \*\*Path significant at the .001 level. \*\*\*Path significant at the .000 level.

#### Appendix 4. Procedures and results of fsQCA

The primary objective behind using a multi-method approach comprising PLS-SEM and fsQCA is to offer a more comprehensive and sophisticated comprehension of the intricate causal associations between causal conditions and targeted outcome constructs. Furthermore, the approach facilitates the evaluation of a model's predictive capacity, based on theoretical and logical principles that result in the generation of more practical suggestions for management (Rasoolimanesh *et al.*, 2021). It has been shown that combining fsQCA with other methods, such as SEM can provide complementary insights into understanding the complex and non-linear nature of human behaviour (Aw *et al.*, 2022; Pappas and Woodside, 2021). To begin with, we input perceived realism, multiple cues, language variety, immediate feedback, personal focus, absorption, affection, participation, and metaverse usage intensity as the causal conditions, with visit intention as the targeted outcome. Two control variables were added, namely gender and age, because differences in metaverse interaction may exist between age groups and genders (Xu *et al.*, 2023). Younger consumers could exhibit higher proficiency and comfort in metaverse engagement than their older counterparts. Additionally, there are potentially diverging technological preferences based on gender.

The fsQCA process begins with the calibration of scales. We defined three qualitative thresholds and converted the data into fuzzy set membership levels that range from complete non-membership (0) to full membership (1), with a crossover point of 0.5 (Ragin, 2009). Following the suggestions made by Pappas and Woodside (2021), we utilised the direct calibration method for the 7-point Likert scales, setting thresholds at 6, 4, and 2, to ensure better generalisability and replicability in other similar research scenarios when utilising this approach. Gender was calibrated dichotomously involving assigning a membership score of 1 to females and a score of 0 to males.

The subsequent phase of the analysis involves identifying all potential combinations of causal conditions and examining the consistency of each combination with the targeted outcome. To this end, we constructed a truth table to ascertain configurations that sufficiently contribute to the presence of visiting intention (Pappas and Woodside, 2021). The truth table comprises  $2^k$  rows, where  $k$  denotes the number of causal conditions. Each row embodies a potential combination of causal conditions. We sorted the truth table by removing rows with two or fewer cases and configurations with a consistency value of less than 0.8 (Rasoolimanesh *et al.*, 2021).

1 We interpreted the intermediate, instead of complex and parsimonious output because it  
2 maintains a balance between comprehensiveness and interpretability by concentrating on  
3 important configurations (Pappas and Woodside, 2021). As demonstrated in *Appendix 5*, the  
4 fsQCA findings present sufficient configurations with acceptable consistency ( $> .80$ ) and  
5 coverage ( $> .20$ ) that yield high visiting intention. In fsQCA, the term "consistency" quantifies  
6 the degree to which cases possessing a specific configuration result in the same outcome. High  
7 consistency suggests the configurations can consistently generate the same outcome, analogous  
8 to correlation in the regression method. Conversely, "coverage" indicates the empirical  
9 significance of a given configuration. This metric evaluates the proportion of the outcome that  
10 is attributable to the configuration, akin to the variance explained in the regression method. As  
11 the consistency and coverage values are above the threshold, it implies sufficient relevant  
12 empirical evidence yielded by the configuration, and a significant proportion of the targeted  
13 outcome (visit intention) can be attributed to the configurations (Pappas and Woodside, 2021).  
14 Three configurations were generated. The first configuration indicates that the presence of  
15 perceived realism, multiple cues, language variety, immediate feedback, personal focus,  
16 absorption, affection, and participation can lead to high visit intention, particularly for male  
17 consumers. The second configuration yields a similar combination, with the only difference in  
18 adding metaverse usage intensity as a condition. The configuration is not bounded by gender  
19 and age. The third configuration highlights that for the young female group, the presence of  
20 perceived realism, multiple cues, language variety, immediate feedback, personal focus,  
21 affection, and participation, with the absence of metaverse usage intensity is important in  
22 fostering visit intention.  
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3 **Appendix 5. fsQCA Results**  
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Solution	Causal conditions ( <i>Outcome: Future Visit intention</i> )	Metrics				
		Raw coverage	Unique coverage	Consistency	Overall solution consistency	Overall solution coverage
1	PR*MC*LV*IF*PF*AB*AFF*PART*~GENDER	0.315	0.148	0.904	0.869	0.775
2	PR*MC*LV*IF*PF*AB*AFF*PART*MU	0.395	0.002	0.825		
3	PR*MC*LV*IF*PF*AFF*PART*~MU*GENDER*~AGE	0.362	0.231	0.809		

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19 *Note:* MC= Multiple cues, LV= Language variety, IF= Immediate feedback, PF= Personal focus, PR= Perceived realism, AB= Absorption, AFF= Affection, PART= Participation, MU= Metaverse usage intensity, VI= Visit intention. (\*) represent the logical AND. (~) represents the negation or absence of a causal condition.  
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