SCIENTIFIC OASIS

International Journal of Economic Sciences

Journal homepage: www.ijes-journal.org
eISSN: 1804-9796

A New Paradigm of Advertising Marketing Experience Based on New Media Extended Reality Technology

Xin Min[1,*], Yuxuan Liu[1], Iek On Lu[1]

[1] Department of Advertising, Communication University of China, Beijing 100024, China

ARTICLE INFO

Article history:
Received 24 March 2025
Received in revised form 14 July 2025
Accepted 20 July 2025
Available online 25 July 2025

Keywords:
Extended reality; Advertising marketing; Advertising experience.

ABSTRACT

As media technology has evolved, advertising formats have also transformed, with extended reality (XR) emerging as a new medium that offers immersive experiences for marketing. This study systematically proposes a new paradigm for immersive advertising in XR environments to enhance user experience and marketing effectiveness. As XR becomes a pivotal marketing tool, its ability to transcend traditional one-way communication calls for a systematic analysis of user experience dynamics. By collecting and analyzing XR advertising cases and prior literature, we identify significant shifts in user experience compared to traditional advertisements. Based on these findings, this paper proposes a model describing the XR advertising experience, which includes three dimensions: multi-sensory presentation, narrative approach, and intelligent interaction. The model also highlights both internal and external factors that influence user experience. The study concludes that XR advertising offers unique advantages in terms of interactive engagement, deep immersion, and personalization, signaling important trends for the future of advertising.

1. Introduction

In the 1960s, McLuhan proposed "the medium is the message". Reviewing the history of the development of advertising communication, which has gone through the era of oral communication, written communication, printed communication, and electronic communication, every change in media technology has given rise to new evolutions in the form of advertising. With the rapid development of computer simulation technology, extended reality (XR) technology has become a new media technology, providing a new experience mode for advertising marketing, immersive advertising experience. Samuel Huber, the founder of Admix, an XR advertising company, pointed out: "Images are better than text, video is better than images, and immersive experiences are far superior." Advertising scholarship has also evolved with the increasing emphasis on technology-mediated communication, recognizing that the paradigm of advertising process and outcomes must shift with the spread of emerging technologies [1].

* *Corresponding author.*
E-mail address: minx@cuc.edu.cn

https://doi.org/10.31181/ijes1412025180

The motivation of this research stems from the dual tension of the iteration of media technology and the lag of academic theories. The evolution history of advertising media from oral communication to XR immersive experiences confirms that each technological leap has restructured the interaction paradigm between brands and audiences. According to recent research, the average dwell time on marketing campaigns using AR is 75 seconds compared to just 2.5 seconds for traditional radio and TV ads), and 71% of shoppers would shop more often at a retailer if AR was offered [2]. This transformation has transcended the level of technological improvement and evolved into a structural disruption of the advertising ecosystem. Some scholars have investigated the impact relationship between media-based brand trust and perceived media value [3]. Although studies have shown that immersive advertising enhances the sense of presence, enables consumers to actively participate in the product experience, and ultimately influences consumers' product knowledge, brand attitude and purchase intention to varying degrees [4], there are still significant blind spots in academic discussions: The perspective of technological determinism often neglects the subjectivity of users. The systematic deconstruction of XR advertising and the interaction experience of users centered on users has not yet been carried out. When Advertising Age declared at the 2016 Cannes Lions International Festival of Creativity that "XR is the next big thing and will usher in a new era of immersive experiential advertising." the eager expectations of the industry contrasted sharply with the theoretical vacuum in the academic circle, and there was an urgent need to establish an evidence-based framework for the application of technology.

This study aims to analyze the practical and methodological goals of extended reality (XR) advertising and marketing through a systematic framework. Based on the four main factors involved in the traditional advertising process can still describe XR advertising: brand (sender), advertisement (message), media (channel) and audience (receiver)[5], the research focuses on the innovation of user experience brought by XR technology: Firstly, this study starts from the brand-new experience that XR advertising content brings to users, analyzes sensory presentation, narrative mode and intelligent interaction, and constructs the "clover model" to describe the XR advertising experience and interaction. This model illustrates the innovative application of XR technology in advertising, which is conducive to breaking through the barrier of one-way communication and achieving immersive and interactive two-way interaction between the audience and the advertising content. Secondly, this study finds that there are three types of factors influencing user experience: sensory presentation factors and narrative factors are external factors, while individual difference factors are internal factors.

In this article, our contribution is twofold. On the one hand, our research has enriched the research achievements of XR advertising and marketing centered on user experience. It focuses on the user themselves and brings the user back to the center of the XR advertisement. On the other hand, we compare XR advertising with traditional advertising to analyze how the user experience brought by XR advertising differs from the past. In addition, we have identified the factors that affect the user experience of XR advertising and marketing, and conducted an in-depth analysis of them, which is helpful in guiding the future direction of XR advertising and marketing and providing a reference for advertisers.

Looking at the structure of the full text, this paragraph is the first part and serves as an introduction. The second part conducts a literature review, and the third part specifically explores the research methods. The "clover Model" was analyzed and constructed from three dimensions: Sensory presentation, narrative approach and intelligent interaction to explain the experience interaction mechanism of XR advertising. The fourth part specifically states the research conclusion and analyzes the internal and external factors of the user experience of XR advertising. In the fifth

part, the study compared traditional advertising with XR advertising and summarized the differences in mutual empowerment between creators and users, engagement and immersion, and personalized content. Finally, the article is summarized in the sixth part, clarifying the contribution of the article and the future research direction.

2. Literature Review

Before establishing a new paradigm for user experience based on XR advertising, we need to review what has been discussed in the past literature on user experience in XR advertising, including virtual reality (VR), augmented reality (AR), and the in-between, mixed reality (MR).The concept of VR was introduced in the 1980s, and over the next four decades or so research on VR and its extensions continued to evolve. VR refers to devices that completely block the user's view, AR is a device that allows the user to see both the physical and virtual worlds at the same time, and Mixed Reality (MR) combines the physical and digital worlds through 3D holograms. Carlos Flavián et al. have also reported a new categorization technique, known as the "EPI cube", to specify the virtual, augmented, and mixed reality. which is used to specify the impact of virtual, augmented and mixed reality technologies on customer experience [6].

Burdea *et al.,* [7] proposed that the core features of VR technology are the "3Is", namely Immersion, Interaction and Imagination. Qin et *al.,* [8] proposed that VR advertising has brought changes to user experience, featuring two characteristics: immersive experience and strong interactivity. Rubio-Tamayo et al. found that the multi-sensory immersive experience of VR ads is more advantageous than traditional ads [9]. Under the point of strong interactivity, Lee et al. pointed out that the interactive behaviors in VR advertisements can blur the boundary between the virtual and the real [10]. XR technology is the result of the continuous development and extension of VR technology, and the characteristics that VR advertisements bring to user experience are referential to the characteristics of the user experience of XR advertisements. Therefore, we combine the characteristics of VR advertisements for user experience and explore the previous research of user experience in the context of XR advertisements from three perspectives: multi-sensory presentation, narrative mode and interactivity.

2.1 Multi-sensory advertising

Visual, auditory, olfactory, tactile, and gustatory senses are the five sensory presentation elements that make up the user experience of XR ads, and the frequency and importance of the application of these elements vary. First of all, unlike smell, touch, vision, and hearing, taste appears significantly later in the research of virtual reality technology and extended reality technology. Dinh et al.'s experiments showed that the superposition of smell, touch, and vision enhanced the user's sense of presence [11]. Serrano et al. further revealed the impact of multi-sensory cues on the user experience of virtual reality experiences. In the virtual environment, the olfactory stimulation that is consistent with the environment can make the user have a more immersive experience; Adding physical objects that provide haptic feedback to actions can also increase the presence of virtual environments [12].

Secondly, visual and auditory information dominates user perception. Hung et al. pointed out that visual information flow receives the most attention, followed by auditory information flow, and lastly olfactory information flow [13]. In the application environment of virtual reality technology, the study of Ramic et al. came to a similar view that, in virtual environments, apart from visual and auditory information, human other senses are often neglected [14].

The synergistic effect of multisensory cues has a significant effect on the enhancement of user experience. Liu et al. conducted a study using immersive technology in a simulated environment and found that the congruence of auditory and olfactory cues had a significant effect on user perception and experience [15]. Goodarzi *et al.,* [16] pointed out that persuasive advertising content—especially those embedded with carefully designed sensory cues, cultural relevance, and emotional resonance—can significantly enhance brand engagement and customer loyalty. These findings point to the strategic value of multi-sensory design in XR advertising beyond technical immersion. *Petit et al.,* [17] called for further research on VR technology in order to create a more enjoyable and more informative multisensory experiences. Burian *et al.,* [18] came to a view that XR-based environments, particularly those developed for critical domains like space medicine, highlight the importance of simulation fidelity and intuitive user interface design in fostering immersion and effective task execution. These applications underscore how sensory presentation is not merely a tool for engagement but a crucial component in mission-critical contexts.

2.2 Active story doing

The narrative approach of XR advertising is fundamentally different from that of traditional advertising, and its core lies in "Active Story Doing", which means that users influence the development of the story through interaction. Van Laer et al. pointed out that users interact with ads through body movements, which enhances their sense of presence, immersion, and integration [19]. The unique narrative approach of XR ads has a wide range of applications in the advertising world.

Secondly, compared with traditional advertisements, the process of narrative transmission is more involved when users experience XR advertisements. In the process of narrative transmission, the user's sense of experience and imagination of the narrative plot will be enhanced, which makes up for the user's insufficient sense of presence and immersion in XR advertisements [20]. The narrative of XR advertisements has a higher degree of personalization. Hollebeek et al. pointed out that characters in XR advertisements can be customized according to the user's characteristics, which enhances the sense of immersion [21]. Subramanian et al. demonstrate that fuzzy logic can support adaptive narrative systems by modeling user uncertainty and predicting individualized interaction paths, which is essential for non-linear storytelling in XR environments [22].

2.3 Interactivity

The interactivity of XR ads enhances ad recognition and attention attraction. Leung et al. showed that consumers showed better directed attention and fewer distractions when viewing XR ads [23]. Interactive devices and scenarios in XR ads increase the depth of the ad experience. De Regt et al. found that 360-degree panoramic advertisements and interactive devices enhanced user immersion in their study [20]. Drawing on business intelligence pathways, Norouzi et al. show that BI systems enhance marketing performance through the mediating effect of customer relationship management. This suggests that XR advertising can similarly benefit from intelligent feedback loops that personalize interaction paths based on behavioral signals and prior engagement history [24].

In summary, XR ads have significantly changed the user's advertising experience through multi-sensory stimulation, Active Story Doing, and interactivity, and are expected to drive further innovation in the advertising industry.

3. Methodology

How do we understand the advertising experience? In particular, how should we summarize and analyze XR advertising more comprehensively for this innovative form of advertising. Taking an

information orientation perspective, advertisements are usually interpreted as relatively fixed stimuli containing or suggesting pre-specifiable information, while consumers are viewed as solitary subjects with no identity who respond to the advertisements through linear phases or limited avenues of persuasion [25]. In contrast, from the meaning orientation perspective, consumers construct a variety of meanings as a result of personal interest-driven, culturally positioned advertising interpretive behavior. This orientation emphasizes the subjective nature of the advertising experience, within the boundaries of the symbolic structure and episodic content of the advertisement as well as the consumer's historical and socio-cultural environment. Contemporary advertising is seen not as an accidental channel of product information, but as a ubiquitous arena of communication in which human reality is mediated [26].

This paper follows the meaning orientation perspective, which emphasizes the importance of the consumer's value to advertising. This study adopts a qualitative research approach to explore the paradigm of advertising marketing experiences in the context of Extended Reality (XR) technology. The research methodology is based on literature analysis and case studies, aiming to identify the core components that define XR advertising experiences and their impact on user engagement. This paper considers that the three major components of ad content are ad presentation, ad narrative and ad interaction. Accordingly, as shown in Figure 1, the XR ad experience interaction model proposed in this section takes the user as the center, analyzes the new experience in sensory, narrative and interaction that XR ad content brings to the user, and conceptualizes the user experience as perceptual presentation, narrative approach and intelligent interaction respectively.

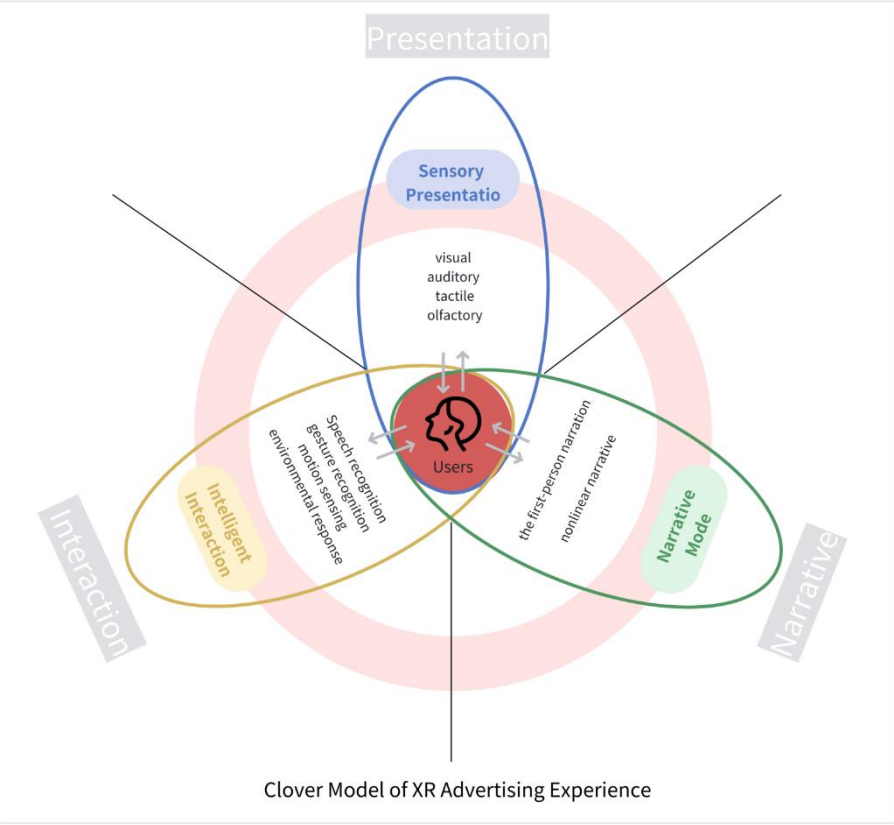

Fig. 1. Model Diagram of XR Advertising User Interaction Experience

Sensory presentation refers to the sensory resonance induced by the stimulation of the five senses, including but not limited to visual stimuli, auditory cues, and tactile feedback (such as

vibrations or temperature changes). Narrative approach refers to the strategy used in XR advertising that employs first-person narrative and non-linear storytelling structures to guide the user through content experiences. It is a user-centered method that allows users to interact within a virtual environment. Intelligent interaction refers to dynamic and personalized engagement with users in XR advertising through data collection and feedback within virtual scenes, including voice recognition systems, gesture or motion sensing interactions, and real-time environmental responses. The model provides a framework for explaining the innovations and benefits that XR technology brings to the user's advertising experience. In addition, we also used three-dimensional diagrams to show the relationship between the elements in the model, as shown in Figure 2.

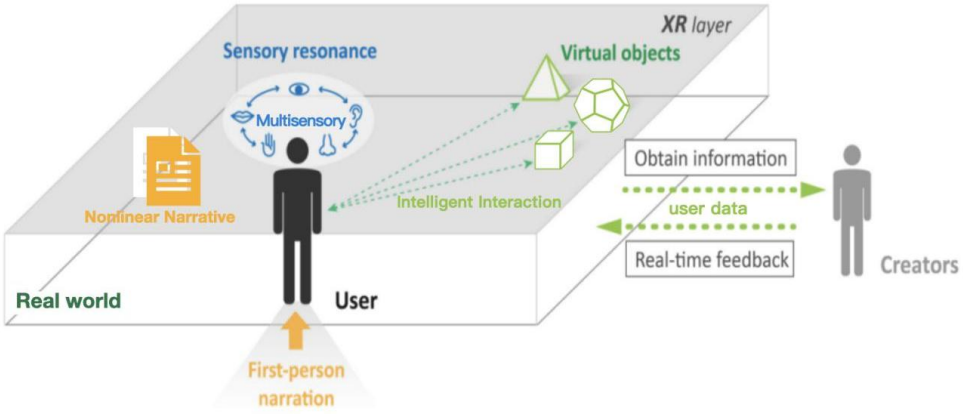

Fig. 2. 3D Schematic Diagram of XR Advertising User Interaction Experience

3.1 Sensory Presentation

The senses are the physiological receivers of human's comprehensive cognition of the objective world. If human beings want to recognize and understand the world, they must receive information symbols through their senses, stimulate the perceptual nerves, and then process them in the brain to form a basic psychological cognition of the world, and finally generate the internal resonance of the surrounding environment [27]. Therefore, the sensory resonance brought by XR advertising is an embodied experience in which physiology, psychology and environment shape and constrain each other. Through the two-way interaction between XR technology and multiple senses, people can produce highly realistic and rich sensory feelings in the virtual environment created by XR ads, receive multiple stimuli from visual, auditory, tactile and other senses, and significantly enhance the sense of immersion in human perception.

The most common sensory stimuli in virtual environments are visual and auditory. However, in recent years, people have increasingly begun to consider the possibility of using strategies to stimulate the senses of smell, touch, or taste, with the aim of improving the user's sensory experience in virtual environments. In order to create a feeling of total immersion, the five senses (vision, hearing, touch, smell, taste) must be physically realistic in perceiving the digital environment. When advertising practitioners use immersive technologies to make the perceptual experience appear: panoramic 3D display (visual), surround sound acoustics (auditory), haptic and force feedback (tactile), odor replication (olfactory), taste replication (gustatory), and somatosensory replication (kinaesthetic) [28], users will feel a stronger sense of immersion and enhance their memory of the advertisement.

Real-world examples of XR technology expanding sensory presentations are also abundant. Audi cars, KFC, and Marriott hotels achieve multi-sensory virtual driving, food tasting, and travel experiences by adding sensory stimuli such as vibration, taste and aroma, heat, and fog, respectively. Among them, haptic feedback is the research hotspot of multi-sensory technology, and researchers have developed haptic gloves Dexmo, HaptX, TactGlove, SenseGlove Nova, somatosensory suits exoskin, Tesla Suit, e-skin, and Lead Skin based on electro-muscular stimulation (EMS), ElecSuit and so on. A series of virtual environment supporting devices to enhance the XR experience. In terms of visual stimulation, Nike's VR 360-degree panoramic commercials allow the viewer to not only experience the actor's journey of pursuing her dream as if it were replayed in their mind, but also watch her every subtle movement and expression in a 360-degree, no-death-angle way.

In the future, with the development and maturity of technology, XR advertising can not only realize the extension of a sense in the virtual space, but also realize the joint stimulation of multiple senses, bringing users a more "real" advertising experience. For example, through the dynamic environment modeling, three-dimensional graphics generation, three-dimensional display and sensing technology, to generate a three-dimensional virtual simulation system, comprehensive integration, extend the human senses, to achieve the resonance of the experience, in order to achieve immersive effect [29].

3.2 Narrative Approach

Creative narratives can evoke emotions and create strong personal associations with brands, products and their values. It can also help build relationships between brands and consumers [30]. This also suggests that marketers need to construct effective narratives in advertising as a way to achieve better advertising results.

In the digital age, marketers are increasingly using storytelling techniques to narratively communicate and persuade their customers. Many marketing studies have examined how storytelling engages and transforms audiences, and XR ads hold the promise of creating a truly immersive storytelling experience, where the effectiveness of narrative persuasion is dramatically improved with the support of XR technology. There are two major shifts in the way that XR ads transform traditional advertising narratives. The first is the change of narrative persona - the first person is commonly used in XR ads, and the audience's identity undergoes an evolution from passive receiver to active participant to co-creator. The other is a shift in narrative structure, where the unidirectional story structure of the advertisement creates a bifurcated multi-path reading pattern in every "entry" and "interaction" of the audience.

3.2.1 Changes in Narrative Persona - First Person Narrative

Niklas Bakos points out that the rules of digital advertising have to be rewritten when advertising moves from a small 2D space to a 360-degree 3D space. With the development of XR technology, the existence of products, people, and spaces in advertisements has changed, and the identity and experience of the viewer has also changed. In XR ads, viewer identity undergoes an evolution from passive receiver to active participant to co-creator.

One-way traditional passive receivers. The "audience-advertising" model is mostly a traditional advertising model. Viewers watch the advertisement in front of the screen, passively accepting the message that the brand wants to convey. The audience in a one-way way to feel the content of the advertisement, the other may be destructive and intrusive, with a negative impact.

Active participants. The "audience-advertising-terminal-interaction" mode is mostly an interactive advertising mode, such as H5 advertising. The audience gets the online experience of the

advertisement through cell phone or network, or utilizes various mobile intelligent terminals in front of the outdoor advertisement, interacts with it and generates an immersive experience, and the audience is in between the interaction between one-way individuals and minority groups.

Co-creator. The "viewer-work-interaction-other viewers" model is mostly an XR advertising model. The viewer is an active, positive participant and becomes part of the advertisement to participate in the creation, and even carries out creative expression together with other viewers. In the virtual space constructed by XR ads, viewers are more likely to realize the existence of other viewers, forming a super link between viewers. Moving from a one-way individual to a group, the presence of the Other in the space is active.

The change in the role of the audience has also led to a change in the narrative of personification in commercials. In traditional advertisements, the most frequently used personification is "you" and "we", because such personification pronouns sound warm and nice, which is conducive to narrowing the distance between the advertisement content and the viewers, and making the advertisement more attractive [31]. In XR ads, the distance between the ad content and the audience almost disappears because the audience becomes the co-creator of the ad content due to the transformation of the audience's identity and experience. The viewer really becomes the "I" in the advertisement. Marketers also use the first person "I" to create narratives in XR ads.

Thus, the change of narrative persona has a significant change for both the audience and the advertiser. From the viewpoint of viewers, the identity of viewers has changed dramatically: receiver-participant-creator, and viewers really participate in the advertisement and build positive connections with others. From the perspective of the ad creator (marketer), XR technology breaks down the boundaries between the viewer and the role of the advertiser in traditional advertisements, thus creating the possibility of a modest collaboration between the ad creator (marketer) and the viewer, whereby the marketer is no longer alone in creating and then "instilling" the message to the viewer.

3.2.2 Changes in Narrative Structure - Non-Linear Narrative

Since the material of interpretation is inseparably combined with the material assemblage, classical works of art are predetermined and characterized by linear narratives. Virtual reality technology, on the other hand, makes non-linear narrative one of its specialties. Art becomes a narrative generated by audience participation, and the expressiveness of the work can be enhanced through interaction with the audience and the imagination of the audience [32].

The emergence of virtual reality technology has transformed the mode of narrative production and consumption, changing the way of information content production and dissemination. The "closed-loop" narrative text in the traditional creation mode, in which the creator is the absolute authority and control, has been broken, and the unidirectional story structure has also produced bifurcated multi-path viewing modes in every "entry" and "interaction" of the audience, thus giving rise to different story endings and central meanings. The unidirectional story structure also generates a bifurcated multi-path viewing mode in every "entry" and "interaction" of the audience, which leads to different story endings and central meanings [33]. The characteristic of non-linear narrative is more and more obvious in XR advertisements.

For example, in a public service announcement (PSA) on the theme of traffic safety, viewers can not only choose the role of pedestrians/vehicle owners in the advertisement story, but also the different behaviors of each character will change the direction of the story and have an impact on the ending of the story. For example, when the pedestrian played by me sees a red light and is about to cross the street, whether he chooses to "wait" or "keep going" will lead to different outcomes. The

production and consumption model of the traditional single-line narrative has been fundamentally changed, and the non-linear narrative structure of the XR ads allows the ads to be personalized and open-ended, and invariably brings the audience a deeper experience and memory.

3.3 Intelligent Interaction

Over the past two decades, developments in information and communication technologies have made interaction between consumers and advertisers easy and fast. Advertisers are increasingly relying on various modes of interactive technologies to advertise and promote their products and services [34]. In today's world, interactive advertisements are flourishing even more in smarter forms. The intelligent interactivity of XR advertisements can be seen as an upgraded form of traditional interactive advertisements.

Intelligent interaction of XR ads is mainly reflected in two aspects, the first is the interaction of behavioral actions and the second is the interaction of data information.

3.3.1 Behavioral Action Interaction - Interaction with Objects in a Virtual Scene

Behavioral interactions in ads make the user part of the persuasion process. For example, many XR advertisements nowadays put a lot of effort into the scene, trying to bring users a more realistic advertising experience by controlling the details. The virtual space of many XR ads will be set up with some small details, such as gesture recognition, interactive devices, and conversation with "passers-by", etc. Although these small interactions won't affect the direction of the story, they will make the overall advertising experience more real and interesting, realize the emotional integration of the audience and the virtual environment, and stimulate the spatial immersive experience.

It is worth mentioning that this kind of behavioral interaction is more commonly used in art museums than in advertising. San Francisco Museum Terracotta Warriors exhibition, the APP developed by the museum through the use of AR to help the museum on the Terracotta Warriors related knowledge dissemination, to achieve the purpose of education, the traditional to static display objects, film dissemination, panel images, etc., into the audience can be manually operated, participate and immersive in the digital multimedia roaming [35]. This also implies that in future XR advertisements, it may be possible to enhance the marketing effect by incorporating more behavioral action interaction experiences.

3.3.2 Interaction of Data Information - Data Collection and Feedback from Creators

With the advent of the Internet and other technologies, the interaction between consumers and marketers is becoming more pronounced. Consumers can gather and provide information by searching and browsing commercial Web sites, they can post and customize their preferences, and they can communicate with other consumers as well as with product and service providers. Similarly, marketers can use information obtained from consumers to customize their advertising messages to segment their audiences, to promote consumer searches for specific types of information and products, and to gather information about consumer preferences to improve future products and services.

The emergence of XR technology in the last few years has increased the timeliness of information and feedback collected by service providers. In addition to recording personal data about people's location, social relationships, verbal communication, search queries, and product preferences, virtual reality devices will also collect nonverbal behaviors-such as a user's posture, eye gaze, gestures, facial expressions, and interpersonal distance. However, when collecting physiological data in XR, it is crucial to carefully consider privacy protection, data security, and ethical issues to ensure user rights

and safety [36]. Traditional security methods often fall short in addressing modern cyber threats. Currently, many new technologies are driving the development of data protection strategies and decision-making analysis [37,38]. In XR ads, physiological information such as eye movements, heartbeat, and body temperature are instantly recorded along with behavioral information such as lifting hands, moving forward, and looking down (e.g., a woman's heart skips a beat when she sees a pair of shoes laying on the ground in front of her and walks over to them immediately). After these data are quickly processed and analyzed by the machine, they will be applied almost without delay to guide the next advertising content (e.g., if the heartbeat acceleration and hand lifting and stroking represent the person's love for a certain type of product, then the next advertisement will reveal more information about the relevant type of product; conversely, the next advertisement will be switched to other products for development).

It can be seen that the difference between XR ads and the message customization of interactive ads in the past is that, in addition to digital traces, information about the user's physiology and behavior while watching the ads can be captured instantly and precise, customized feedback can be given quickly.

4. Results

XR ads' unique advertising logic, technical features and the unique user experience they bring have made them favored by more and more advertisers. Undeniably, unlike traditional advertising, XR advertising involves more factors that may affect user experience in practice. As ad creators, we should optimize the user's ad experience to bring better impact and revenue generation for advertisers. Qin et al. proposed changes in sensory, narrative, and hardware dimensions of XR ads, and user experience influencing factors are further enriched with the development of technology. Based on this, we organized a model of factors affecting user experience in XR advertising [8]. As shown in Figure 3, there are three categories of factors affecting user experience, namely sensory presentation factors and narrative style factors, which are external factors, and individual differences factors, which are internal factors. These factors especially significantly influence the user experience in XR advertisements.

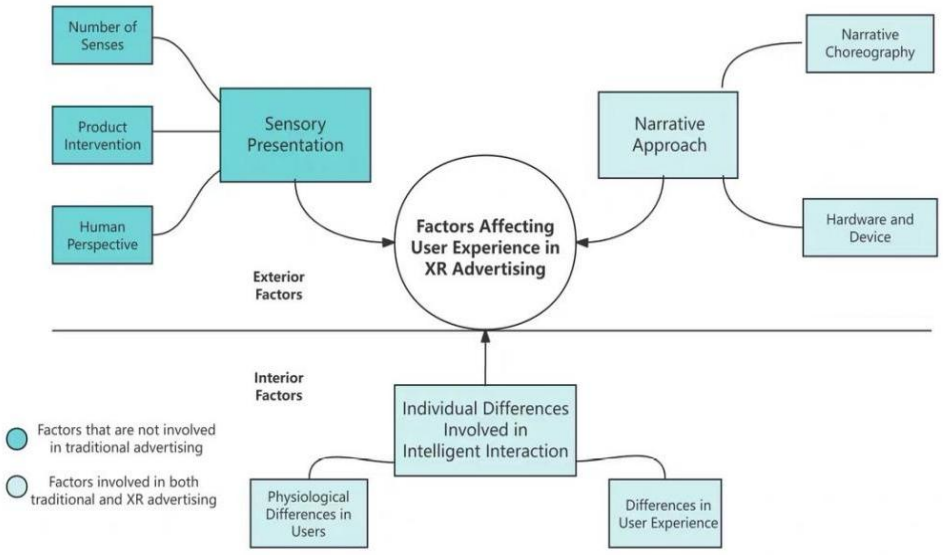

Fig. 3. Comparison of User Experience Factors between XR Advertising and Traditional Advertising

4.1 Sensory Presentation

4.1.1 Effect of Sensory Quantity on Sensory Presentation

Sight, hearing, smell, taste and touch make up the five sensory elements in XR advertising. When the number of senses present in an XR advertisement varies, so does the user's experience. Research by Van Laer and others has shown that multisensory stimuli that have consistency with the environment can create a more immersive experience for the user; the addition of physical objects that provide haptic feedback for actions can also increase the presence of the virtual environment [19].

However, the combination of sensory cues needs to be balanced. Lindeman *et al.,* [39] study of multisensory design spaces in virtual environments showed that multiple simultaneous sensory cues may make one of the sensory cues invisible, or even lead to the user having a perceptual overload, and that perceptual overload can lead to confusion and cognitive stress. Li *et al.,* [40] noted that multiple sensory stimuli may trigger perceptual overload, leading to cognitive stress and confusion. Advertising practitioners should recognize the significant impact of the consistency, combination situation, and modal situation of the five sensory elements on user experience, and avoid blindly imposing sensory elements in XR ads.

4.1.2 Effect of Product Intervention on Sensory Presentation

In XR advertising, the level of product involvement affects the cognitive path of users. The degree of product involvement refers to the degree of involvement of the product in the content of the advertisement and the level of interaction between the user and the product in the process of experiencing the XR advertisement. Cowan *et al.,* [41] found in their study that the degree of product involvement directly affects the consumer's response through the paths of imagination and co-creativity.

It is worth noting that different types of product advertisements require different product intervention strategies in designing interactions. In a study on traditional advertisements, Hassenzahl *et al.,* [42] suggest that utilitarian and hedonic attributes jointly determine the user experience. Mishra *et al.,* [43] find that hedonic products (e.g., hotels, travel) need to emphasize the sensory experience in XR advertisements while utilitarian products (e.g., home appliances) focus on a high degree of intervention. Therefore, ad creators should choose appropriate intervention strategies according to product characteristics and design user experience rationally.

4.1.3 The Effect of Human Perspective on Sensory Presentation

Compared to traditional advertisements, users in XR advertisements can choose to select more perspectives, third-person and first-person perspectives. Gorisse *et al.,* [44] showed that the first-person perspective helps to enhance the user's sense of embodiment and make him/her better integrated into the virtual environment, while the third-person perspective enhances spatial awareness. For example, in the 'Nikeland' advertisement launched by Nike in collaboration with Roblox, users experience motion interactions in the virtual world through the third-person perspective, providing unprecedented spatial awareness. Therefore, ad creators should choose the appropriate perspective design according to the content and purpose of the ad to enhance user experience.

4.2 Individual differences involved in intelligent interaction

4.2.1 Physiological Differences in Users

Physiological differences between users at the mental level may lead to differences in user experience. Cowan *et al.,* [45] found in their study that user's imagination compensates for the lack of haptic sensation in virtual experiences and enriches the sensory experience.

Visual tracking technology, on the other hand, faces challenges in practical applications such as individual pupil distance and vision conditions, which affect the user experience. In addition, gesture interaction technology is also a popular trend in XR ads, but the physiological differences of users may limit the performance of the technology. Advertising practitioners need to fully understand the physiological characteristics of target users to decide whether to apply these recognition technologies in advertisements.

4.2.2 Differences in User Experience.

The user's own experience factor influences the experiential sensory experience that the user gets from XR ads. A study by Cowan *et al.,* [45] found that consumers who were highly knowledgeable about XR technology tended to also be very interested in the application of XR technology, which drove them to develop a further awareness of XR ads. On the contrary, inexperienced users may be repelled by advertisements due to device discomfort. Sagnier *et al.,* [46] noted that users' personal innovativeness influences their assessment of the usefulness of XR advertisements, and that users who are easily attracted to new technologies are more likely to be receptive to XR advertisements. However, the popularity of XR technology varies around the world, and many users are still unfamiliar with the technology. Advertising creators should fully consider the technical experience level and acceptance of users in the target market when choosing advertising formats.

4.3 Narrative approach

4.3.1 Narrative Choreography

Personalization is a major feature of narrative choreography in XR ads compared to traditional ad narratives. Ahn et al. found in their study that virtual reality ads promote a more favorable user experience when the characters have a high degree of similarity in appearance to the user [47]. In addition, information overload has become a factor to be aware of in the narrative. choreography of XR advertisements. A study by Cowan *et al.,* [48] found that too much information can lead to information overload. In XR advertisements, too much product knowledge combined with too much sensory information can reduce consumer response. Therefore, sensory information should be balanced with pre-existing information to avoid the phenomenon of perceptual overload. Ad creators should rationalize the balance between sensory information and narrative content to avoid causing cognitive burden to users. The use of spatial storytelling in *The Enemy* illustrates how digital media enable new narrative paradigms, where users co-construct meaning by navigating virtual environments [49].

4.3.2 Influence of Hardware and Device Narrative Effects

The compatibility between the XR ad experience platforms and apps used by users on mobile and XR ads may affect the user's experience. When the frame rate and sound effects required for loading XR Ads are high, and the mobile segment platform used by the user is unable to meet these requirements, the user's experience will be greatly reduced. In addition, the performance of the hardware used to experience XR ads may also affect the user experience. Unlike traditional advertising, XR advertising often requires the interaction and compatibility of multiple hardware and

platforms, such as HMD devices, virtual environment configurations, and projection devices. With the gradual increase in the frequency of application of neglected senses such as touch and smell, tactile and olfactory sensor configurations are gradually becoming essential hardware for XR advertising.

Although the technical difficulties involved in XR ads may have a negative impact on the user experience, the successful resolution of the technical difficulties can't be ignored in improving the user experience. Take Meta's recently launched "The Impact is Real" advertisement as an example, which demonstrates Meta's XR technology and equipment in a comprehensive manner and achieves excellent results. Meta's new device solves the technical difficulties in the application of XR technology in the field of advertising such as latency, real rate, sensor configuration, etc., and brings a brand new user experience. Advertisers should fully consider whether the application scenarios of their products are compatible with the technical difficulties of their hardware devices, and conduct sufficient research before choosing XR technology as an advertising medium.

5. Discussion

With the widespread adoption of XR technology [50], major brands are integrating XR into their marketing strategies, such as Volvo's virtual test drive for the XC90, JLL Residential's virtual property viewing in London, Marriott's VRoom Service virtual tourism experiences and VR Postcards, Nike's Hypervenom II virtual football match, The New York Times' acquisition of VR advertising company Fake Love, Toyota's VR TeenDrive365 public service advertisement, Häagen-Dazs' Concerto Timer experience advertisement, Volkswagen's XR outdoor advertising, The Washington Post's print media advertising, and Microsoft's MakeWhat'sNext International Women's Day public service advertisement. It is evident that XR advertising is widely applied in industries such as dining, hospitality, furniture retail, automotive, and entertainment.

Compared to traditional advertising, XR advertising offers a number of innovative aspects in user experience that marketers can enhance through perceptual presentation and intelligent interaction. For example, IKEA creates a story-driven environment that immerses users in a virtual world of future homes. On the perceptual presentation level, this virtual world features vivid colors and 3D furniture models. Spatial sound technology enhances user experience by playing natural environmental sounds (such as birds chirping and wind blowing) and interactive furniture sound effects (such as the sound of drawers opening). Additionally, haptic gloves allow users to feel the realistic texture of furniture materials in the virtual store, such as the softness of fabric or the grain of wood. On the intelligent interaction level, users can design their virtual space layout using voice commands and gesture controls, instantly seeing the placement effect of furniture and adjusting based on virtual scene suggestions. These dynamic interactions directly influence narrative progression and product display. On the narrative approach level, users can choose different roles such as designer, homeowner, or sustainability advocate, each with different tasks and furniture needs. Users advance the storyline by exploring and interacting, for instance, creating eco-friendly living spaces or designing solutions for small spaces, thereby strengthening their connection with the product and brand values. This "Visionary Home Experience" XR activity, through the organic combination of perceptual presentation, narrative approach, and intelligent interaction, not only offers users a deeply immersive personalized experience but also effectively conveys IKEA's brand values and product characteristics. Users who participate in such an interactive experience develop a deeper understanding and affinity for the brand, increasing purchase intentions and brand loyalty. Therefore, it is recommended that advertisers incorporate XR technology as a new medium in future

marketing campaigns to establish closer connections with audiences and enhance brand awareness through these strategies.

Traditional advertising models typically use single-sensory stimuli (primarily visual and auditory) and third-person narration to convey brand information, relying on the passive reception of the audience. In this advertising model, user engagement is relatively low, and advertising information is usually presented in a "propagative" manner. In contrast (Table 1), XR advertising greatly enhances user engagement and immersion through multi-sensory presentation, first-person immersive storytelling, and intelligent interaction, transforming advertising into an active experience rather than passive reception. This approach fosters deeper brand understanding and emotional connection. The following sections further discuss the innovations of XR advertising.

Table 1
Comparison of Traditional Advertising and XR Advertising

Features	Traditional Advertising	XR Advertising
Sensory Presentation	Single-sensory stimulation	Multi-sensory presentation
Narrative Style	Third-person narrative	First-person immersive narrative
Interactivity	Passive information reception	Intelligent interaction (voice, gesture control)
User Engagement	Low	High
Brand Understanding and Connection	Surface understanding	Deep understanding and emotional connection

5.1 Two-way Empowerment

Traditionally, advertising has been defined as "a controlled form of communication that attempts to persuade consumers to buy or use a particular product or service through the use of various tactics and appeals" [51]. This definition reflects the fact that advertising has traditionally used "persuasion" as a form of one-way communication to get consumers to buy or use a product. However, it is becoming increasingly clear that while the central goal of advertising is still to persuade consumers to buy a product or service, technology is helping to make personalized advertising possible. Advertising today can be viewed as an experience in which the consumer participates. As a result, the communication model of advertising as impersonal and completely controlled by the sponsor seems to be evolving into a model in which advertising is personal and interactive [52]. This model is particularly salient today with the growth of XR advertising.

XR advertising breaks the one-way description of products and services by advertising creators, a traditional "transmitter-receiver relationship", and gives viewers more autonomy. For example, which character to play in the ad, what action to perform in the ad, which item to choose in the virtual environment. All of these are chosen and practiced by the viewer, rather than simply watching the advertisement from a spectator's point of view. The viewer is empowered to interact on his/her own, which is much more powerful than in traditional Internet advertisements. In addition to giving power to "viewers", XR advertising also gives power to "ad creators", that is, creators can instantly adjust the presentation of advertising content based on captured user information data. This two-way empowerment of "ad viewers" and "ad creators" is one of the features that differentiate XR ads from traditional ads, and makes XR ads more attractive and persuasive to customers, and more maneuverable for advertisers.

5.2 Presence and Participation

The emergence of virtual reality technology has dissolved the externalized interface form of the communication field, reconstructed the communication environment in the form of "ubiquity", wrapped the actors in it, and achieved interoperability with virtual reality. The function of symbolic medium has been weakened, and the temporal and spatial barriers of the communication field have been broken through. The "human" becomes the core participant in the field of sensing and sending out information, and its image returns to the center of the communication field [53]. Websites are considered to be low-immersion virtual environments because of the limited interactivity and lack of rich sensory input, which reduces the sense of presence, while virtual reality is considered to be a high-immersion virtual environment because of its ability to reproduce perceptual richness, which enhances the sense that the virtual experience is real [47].

Through XR technology, people watching the advertisements obtain rich virtual sensory experiences, realize a sense of immersion with the help of imagination, and then break the boundaries of time and space set by traditional media to realize the presence of the body. In this new "embodied" communication model, human subjectivity is constantly strengthened and highlighted. The formation of sensory resonance experience in XR advertising and the interactive behavior of audience participation in advertising can promote effects similar to real use, enhance immersion, realize people's "presence", enhance the persuasive effect of advertising and stimulate people's purchasing motivation.

5.3 Personalized Content

Hundreds of advertising appeals provided by TV, magazines, newspapers, billboards, direct mail solicitations, email spam, World Wide Web banners and pop-up boxes ..... Unlike these traditional advertisements, which present information "as is", XR advertisements can be customized according to the needs and interests of the user by sensing and recognizing the user's location, physiology, and behavior.

The immersive spaces created by virtual reality technology extend the concept of media context to a broader scope, as the media context around advertising shifts from the media that surrounds it (e.g., television programs) to immersive worlds with rich, dynamic sensory-motor cues. And hyper-personalization is quite possible in virtual worlds. Where the media context can be tailored to respond to the needs and motivations of consumers at any given moment in real time, for example, by integrating wearable sensors [54]. Hyper-personalized advertisements will allow consumers to change the media context as needed at any time, and advertisements embedded in the media context will flexibly adapt and present contextually relevant information [1].

Users are free to choose the content of the advertisements they want to engage with and interact with them as they wish. This personalized interactive experience can enhance the user's engagement with the advertisement.

6. Conclusions

With the development of communication technology becoming more interactive, personalized and complex, advertising has also evolved, and XR advertising marketing is an inevitable product of technological development. This study takes "XR advertising marketing experience" as the core, combines academic theories and industry case studies, and constructs a new paradigm of XR advertising marketing experience. From the perspectives of sensory, narrative and interaction, this model explains the unique experience of XR ads in terms of sensory presentation, narrative and intelligent interaction, and emphasizes the subjective position of human beings in XR ads.

We believe that the analysis of the factors affecting user experience in XR ads in the article is instructive for the marketing. On the one hand, from the internal point of view, the user's processing of information is a subjective factor that affects the XR ad experience, for example, because of the user's imagination, familiarity with the virtual reality product, and the degree of understanding of the product. On the other hand, two external factors, information presentation and ad placement, also have a significant impact on the XR ad experience.

XR advertising marketing is a revolution in traditional advertising and the future of advertising. This study proposes a paradigm model for the interactive experience of XR advertising marketing. In the future, the interactivity, immersion and personalization of advertisements will be further strengthened, and new features may even be derived. In the future, as the cost of XR technology decreases and its accessibility expands, small businesses will be able to widely adopt this technology, and XR advertising will become very common.

This study proposes a paradigm model for the interactive experience of XR advertising, but there are certain limitations. The main limitation is that the research only explored the qualitative aspects. Future studies could delve into quantitative measurements, expert interviews and cross-cultural analysis to validate this model, allowing for a more rigorous and comprehensive analysis of the impact of XR advertising on user experience. It is foreseeable that with the rapid development of new media technology, the popularization of XR technology will bring a new development to the advertising industry.

Author Contributions

Conceptualization, X.M.; Methodology, X.M., Y.L., and I.O.L.; Formal analysis, X.M., Y.L., and I.O.L.; Investigation, Y.L., and I.O.L.; Resources, X.M., Y.L., and I.O.L.; Writing—original draft preparation, Y.L., and I.O.L.; Writing—review and editing, X.M.; Visualization, Y.L., and I.O.L.; Supervision, X.M.; Project administration, X.M.; Funding acquisition, X.M. All authors have read and agreed to the published version of the manuscript.

Funding

This research was funded by the Brand Discipline Research Innovation Project of the Advertising School of Communication University of China and Boya Brand Research Institute, grant number BYYB2302.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

This research was funded by the Brand Discipline Research Innovation Project of the Advertising School of Communication University of China and Boya Brand Research Institute, grant number BYYB2302.

References

[1] Ahn, S. J. (Grace), Kim, J., & Kim, J. (2023). The future of advertising research in virtual, augmented, and extended realities. *International Journal of Advertising, 42*(1), 162–170. https://doi.org/10.1080/02650487.2022.2137316

[2] Hackl, C., & Wolfe, S. G. (2017). *Marketing new realities: An introduction to virtual reality & augmented reality marketing, branding, & communications.* (No Title).

[3] Liao, W., Tian, Z., & Edalatpanah, S. A. (2025). Does perceived media values affect customers' trust in media-based brands? *Accounting and Auditing with Applications, 2*(1), 62–77. https://doi.org/10.21203/rs.3.rs-3990942/v1

[4] Faria, A. P., & Cunha, J. (2023, July). Extended reality (XR) in the digital fashion landscape. In *International Conference on Fashion communication: Between tradition and future digital developments* (pp. 49–56). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-38541-4_5

[5] Leckenby, J. D., & Li, H. (2000). From the editors. *Journal of Interactive Advertising, 1*(1), 1–3. https://doi.org/10.1080/15252019.2000.10722039

[6] Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research, 100*, 547–560. https://doi.org/10.1016/j.jbusres.2018.10.050

[7] Burdea, G. C., & Coiffet, P. (2003). *Virtual reality technology.* John Wiley & Sons. https://doi.org/10.1162/105474603322955950

[8] Qin, H., & Lei, J. (2019, September). The application of virtual reality technology in advertising communication. In *2019 International Conference on Virtual Reality and Intelligent Systems (ICVRIS)* (pp. 73–76). IEEE. https://doi.org/10.1109/ICVRIS.2019.00027

[9] Rubio-Tamayo, J. L., Gertrudix Barrio, M., & García García, F. (2017). Immersive environments and virtual reality: Systematic review and advances in communication, interaction and simulation. *Multimodal Technologies and Interaction, 1*(4), 21. https://doi.org/10.3390/mti1040021

[10] Lee, K. Y. (2012). Consumer processing of virtual experience in e-commerce: A test of an integrated framework. *Computers in Human Behavior, 28*(6), 2134–2142. https://doi.org/10.1016/j.chb.2012.06.018

[11] Dinh, H. Q., Walker, N., Hodges, L. F., Song, C., & Kobayashi, A. (1999, March). Evaluating the importance of multi-sensory input on memory and the sense of presence in virtual environments. In *Proceedings IEEE Virtual Reality (Cat. No. 99CB36316)* (pp. 222–228). IEEE. https://doi.org/10.1109/VR.1999.756955

[12] Serrano, B., Baños, R. M., & Botella, C. (2016). Virtual reality and stimulation of touch and smell for inducing relaxation: A randomized controlled trial. *Computers in Human Behavior, 55*, 1–8. https://doi.org/10.1016/j.chb.2015.08.007

[13] Hung, K. (2000). Narrative music in congruent and incongruent TV advertising. *Journal of Advertising, 29*(1), 25–34. https://doi.org/10.1080/00913367.2000.10673601

[14] Ramic-Brkic, B., & Chalmers, A. (2010, June). Virtual smell: Authentic smell diffusion in virtual environments. In *Proceedings of the 7th International Conference on Computer Graphics, Virtual Reality, Visualisation and Interaction in Africa* (pp. 45–52). https://doi.org/10.1145/1811158.1811166

[15] Liu, R., Hannum, M., & Simons, C. T. (2019). Using immersive technologies to explore the effects of congruent and incongruent contextual cues on context recall, product evaluation time, and preference and liking during consumer hedonic testing. *Food Research International, 117*, 19–29. https://doi.org/10.1016/j.foodres.2018.04.024

[16] Goodarzi, K., Neishabori, M. K., Naami, A., & Dastoori, M. (2022). Developing a content marketing model with goal to improve brand of countrywide the banking industries. *International Journal of Research in Industrial Engineering, 11*(1), 50–61. https://doi.org/10.22105/riej.2021.305326.1247

[17] Petit, O., Velasco, C., & Spence, C. (2019). Digital sensory marketing: Integrating new technologies into multisensory online experience. *Journal of Interactive Marketing, 45*, 42–61. https://doi.org/10.1016/j.intmar.2018.07.004

[18] Burian, B. K., Ebnali, M., Robertson, J. M., Musson, D., Pozner, C. N., Doyle, T., ... & Dias, R. D. (2023). Using extended reality (XR) for medical training and real-time clinical support during deep space missions. *Applied Ergonomics, 106*, 103902. https://doi.org/10.1016/j.apergo.2022.103902

[19] Van Laer, T., Feiereisen, S., & Visconti, L. M. (2019). Storytelling in the digital era: A meta-analysis of relevant moderators of the narrative transportation effect. *Journal of Business Research, 96*, 135–146. https://doi.org/10.1016/j.jbusres.2018.10.053

[20] de Regt, A., Plangger, K., & Barnes, S. J. (2021). Virtual reality marketing and customer advocacy: Transforming experiences from story-telling to story-doing. *Journal of Business Research, 136*, 513–522. https://doi.org/10.1016/j.jbusres.2021.08.004

[21] Hollebeek, L. D., Clark, M. K., Andreassen, T. W., Sigurdsson, V., & Smith, D. (2020). Virtual reality through the customer journey: Framework and propositions. *Journal of Retailing and Consumer Services, 55*, 102056. https://doi.org/10.1016/j.jretconser.2020.102056

[22] Subramanian, B., Mishra, A., Bharathi, V. R., Mandala, G., Kathamuthu, N. D., & Srithar, S. (2025). Big data and fuzzy logic for demand forecasting in supply chain management: A data-driven approach. *Journal of Fuzzy Extension and Applications, 6*(2), 260–283. https://doi.org/10.22105/jfea.2025.488816.1703

[23] Leung, X. Y., Lyu, J., & Bai, B. (2020). A fad or the future? Examining the effectiveness of virtual reality advertising in the hotel industry. *International Journal of Hospitality Management, 88*, 102391. https://doi.org/10.1016/j.ijhm.2019.102391

[24] Norouzi, H., Gohar, M. R., & Imanipour, H. (2023). Investigating the effect of business intelligence competency dimensions on marketing performance considering the mediating role of customer relationship management. *Innovation Management and Operational Strategies, 4*(4), 401–417. https://doi.org/10.22105/imos.2024.434555.1328

[25] Buhl, C. (1991). The consumer's ad: The art of making sense of advertising. *Larsen et al, 1991*, 104–127. https://doi.org/104-127.10.1515/semi.2004.2004.152-1-4.1

[26] Mick, D. G., & Buhl, C. (1992). A meaning-based model of advertising experiences. *Journal of Consumer Research, 19*(3), 317–338. https://doi.org/10.1086/209305

[27] Ye, H. (2011). Research trends in embodied cognition in Western psychology. *Journal of Central China Normal University: Humanities and Social Sciences Edition*.

[28] Classen, C. (2012). *The deepest sense: A cultural history of touch.* University of Illinois Press. https://doi.org/10.5406/illinois/9780252034930.001.0001

[29] Xuezhi, J., & Zhonghua, L. (2004). Research status of virtual reality technology at home and abroad. *Journal of Liaoning Technical University, 2*, 238–240.

[30] Li, M. (2015). *Narrative advertising* [Master's thesis, East Tennessee State University].

[31] Linghong, Z. (2006). The linguistic features of English advertising. *Celea Journal, 29*(1), 71–78.

[32] Grau, O. (2004). *Virtual art: From illusion to immersion.* MIT Press.

[33] Duan, P., & Li, Q. (2019). Narrative · Subject · Space: An exploration of the communication mechanism and effects of immersive media under virtual reality technology. *Modern Communication (Journal of Communication University of China), 41*(04), 89–95.

[34] Pavlou, P. A., & Stewart, D. W. (2000). Measuring the effects and effectiveness of interactive advertising: A research agenda. *Journal of Interactive Advertising, 1*(1), 61–77. https://doi.org/10.1080/15252019.2000.10722044

[35] Song, K. (2017). Virtual reality and Van Gogh collide—technology is turning museums into a booming industry. *CNBC*.

[36] Santander Moreno, J. J., Ortega Matoma, J. A., Dávila Castillo, M. R., & Ordóñez Sarchi, J. A. (2024). A neutrosophic framework for evaluating security measures in information systems. *Journal of Fuzzy Extension and Applications, 5*(Special Issue), 12–24.

[37] Dindi, A., Qamili, A., Karroçi, E., & Sheikhaleslami, Z. (2024). The impact of artificial intelligence on cybersecurity. *Karshi Multidisciplinary International Scientific Journal, 1*(2), 215–224.

[38] Bharadwaj, B., Nayak, S., & Panigrahi, P. K. (2025). Sentiment analysis for identifying depression through social media texts using machine learning technique. *Big Data and Computing Visions, 5*(2), 102–118.

[39] Feng, M., Dey, A., & Lindeman, R. W. (2016, March). An initial exploration of a multi-sensory design space: Tactile support for walking in immersive virtual environments. In *2016 IEEE Symposium on 3D User Interfaces (3DUI)* (pp. 95–104). IEEE. https://doi.org/10.1109/3DUI.2016.7460037

[40] Li, B. J., & Bailenson, J. N. (2018). Exploring the influence of haptic and olfactory cues of a virtual donut on satiation and eating behavior. *Presence, 26*(3), 337–354. https://doi.org/10.1162/pres_a_00300

[41] Cowan, K., & Ketron, S. (2019). A dual model of product involvement for effective virtual reality: The roles of imagination, co-creation, telepresence, and interactivity. *Journal of Business Research, 100*, 483–492. https://doi.org/10.1016/j.jbusres.2018.10.063

[42] Hassenzahl, M. (2008, September). User experience (UX) towards an experiential perspective on product quality. In *Proceedings of the 20th Conference on l'Interaction Homme-Machine* (pp. 11–15). https://doi.org/10.1145/1512714.1512717

[43] Mishra, A., Shukla, A., Rana, N. P., & Dwivedi, Y. K. (2021). From "touch" to a "multisensory" experience: The impact of technology interface and product type on consumer responses. *Psychology & Marketing, 38*(3), 385–396. https://doi.org/10.1002/mar.21436

[44] Gorisse, G., Christmann, O., Amato, E. A., & Richir, S. (2017). First-and third-person perspectives in immersive virtual environments: Presence and performance analysis of embodied users. *Frontiers in Robotics and AI, 4*, 33. https://doi.org/10.3389/frobt.2017.00033

[45] Cowan, K. L., & Dai, B. (2014). Who is the "self" that buys?: An exploratory examination of imaginative consumption and explanation of opinion leadership. *Psychology & Marketing, 31*(11), 1008–1023. https://doi.org/10.1002/mar.20749

[46] Sagnier, C., Loup-Escande, E., Lourdeaux, D., Thouvenin, I., & Valléry, G. (2020). User acceptance of virtual reality: An extended technology acceptance model. *International Journal of Human–Computer Interaction, 36*(11), 993–1007. https://doi.org/10.1080/10447318.2019.1708612
[47] Ahn, S. J., & Bailenson, J. N. (2011). Self-endorsing versus other-endorsing in virtual environments. *Journal of Advertising, 40*(2), 93–106. https://doi.org/10.2753/JOA0091-3367400207
[48] Cowan, K., Spielmann, N., Horn, E., & Griffart, C. (2017). Perception is reality: How luxury brands' implementation of telepresence and haptic factors in digital environments affects brand evaluations. In *Proceedings of The Global Brand Conference*, Kalmar, Sweden.
[49] Joorbonyan, Z., Sorourkhah, A., & Edalatpanah, S. A. (2024). Identifying and prioritizing appropriate strategies for customer loyalty in a mass environment (case study: Clothing house). *Journal of Decisions and Operations Research, 9*(1), 98–119.
[50] Zoleykani, M. J., Abbasianjahromi, H., Banihashemi, S., Tabadkani, S. A., & Hajirasouli, A. (2023). Extended reality (XR) technologies in the construction safety: Systematic review and analysis. *Construction Innovation, (ahead-of-print)*. https://doi.org/10.1108/CI-05-2022-0131
[51] DeFleur, M. L., & Dennis, E. E. (2002). *Understanding mass communication.*
[52] Lombard, M., & Snyder-Duch, J. (2001). Interactive advertising and presence: A framework. *Journal of Interactive Advertising, 1*(2), 56–65. https://doi.org/10.1080/15252019.2001.10722051
[53] Yu, F. S., & Zhang, Y. (2020). Immersive communication: Sensory resonance, image restoration and presence participation. *Journal of Nanchang University (Humanities and Social Sciences), 2*, 96–103.
[54] Ball, C., Novotny, E., Ahn, S. J., Hahn, L., Schmidt, M. D., Rathbun, S. L., & Johnsen, K. (2021). Scaling the virtual fitness buddy ecosystem as a school-based physical activity intervention for children. *IEEE Computer Graphics and Applications, 42*(1), 105–115. https://doi.org/10.1109/MCG.2021.3130555