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Towards a Collective Approach of Immersive 3D Servicescape in the Metaverse Experience: Insights from Thematic Content Analysis

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Abstract: *This study synthesizes the current landscape of servicescape research within the context of the metaverse, identifying future academic challenges for the evolution of immersive 3D servicescapes. The research highlights key trends, gaps, and emerging themes in the field by utilizing a comprehensive thematic content analysis of existing literature review data and insights from focus group interviews with metaverse experts. Findings reveal that metaverse-related research in the field of servicescape has been proposed in five directions: (a) dynamics between physical and virtual servicescapes, (b) redefining servicescape measurements for the metaverse, (c) evolving the s-o-r framework, (d) personalization and adaptation of extended reality environment, and (e) necessity of domain-specific approach. The study proposes a roadmap for future investigations, contributing to the academic discourse by providing a nuanced understanding of immersive 3D servicescapes and suggesting strategic directions for further research.*

Keywords: Immersive 3D Servicescape; Intelligent Servicescape; Metaverse; Thematic Content Analysis

1. Introduction

The concept of "servicescape," coined by Bitner in 1992, blends the words "service" and "scape" (space) to describe the built environment where services are delivered [1, 2]. This idea has significantly contributed to understanding how service environments impact service quality across various sectors, including dining, tourism, healthcare, and education. As we advance into the age of augmented and virtual realities, the definition and scope of servicescapes must evolve to include digital and immersive environments, particularly within the metaverse. The metaverse represents a convergence of virtually enhanced physical reality and physically persistent virtual space, integrating augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies. Companies like Apple and Meta are spearheading this revolution with products like Vision Pro™ and Oculus Quest 3™, signaling the dawn of spatial computing [3]. These developments promise to transform user interactions with digital content through extended reality (XR) technologies, which combine AR, VR, and MR to create immersive experiences.

Despite the rapid advancements in XR technologies, there is a notable gap in current research regarding the interpretation of metaverse environments from a servicescape perspective [4]. Traditional servicescape studies have focused predominantly on physical environments, and while there have been some explorations into e-servicescapes, the unique characteristics of metaverse environments necessitate a re-evaluation of existing frameworks and metrics. This research aims to bridge this gap by synthesizing the current status of servicescape research in the metaverse and proposing future academic challenges.

This study employs Thematic Content Analysis (TCA) to analyze existing literature and insights from focus group interviews with metaverse experts. TCA is a method for identifying, analyzing, and reporting patterns within data, providing a rich, detailed account of complex qualitative data. This approach will allow us to uncover recurring themes and patterns that can inform future research directions and theoretical developments.

This study's findings will highlight key trends and gaps in current servicescape research, offering a roadmap for future investigations. By focusing on user experience, intelligent design, and the integration of advanced technologies, this research aims to contribute significantly to the academic discourse on servicescapes and provide practical insights for further research related to the metaverse.

The key research questions could be summarized as follows:

- How has the initial concept of Bitner's servicescape evolved alongside the immersive user experience in the metaverse?
- How have the traditional concepts of servicescape, theoretical frameworks, processes, and evaluation metrics been adapted to fit the immersive user experience of the metaverse?
- Which topics could be addressed in servicescape research to support the immersive user experience in the metaverse?

2. Theoretical Background

2.1 Evolving Definition of Servicescape Definition

In Bitner's initial servicescape research in 1992, the focus was solely on physical and artificially created spatial environments as the subject of servicescape [1], [5]. With the advent of online shopping environments, concepts such as e-servicescapes and social factors based on other customers or staff have emerged. These account for changes in the service environment perceived by customers, including technological elements tailored to intelligent settings.

2.2 Conventional Framework of Servicescape

The functioning process of servicescape is fundamentally based on the S-O-R (Stimulus-Organism-Response) model framework commonly referred to in customer behavior models [6]. This model allows understanding the causality between a company's input (Stimulus), psychological processes of customers (Organism), and the company's outcomes (Response), including management systems, resource allocation, brand awareness, loyalty, customer satisfaction, and the psychological processes of consumers and company performance [7-10]. It is based on the logic that elements within the service environment (analytical indicators) influence the psychology of customers and managers, leading to various behaviors and responses.

To elaborate on the S-O-R model's application to servicescape, the Stimulus represents the various elements that constitute the servicescape. The Organism refers to the customers and managers within the service environment, and the Response signifies the behaviors and reactions of customers and managers following a service experience. Thus, service providers strategically arrange the elements of the servicescape to facilitate the service delivery process and smooth interaction between customers and managers. People respond not to individual elements but to the overall ambiance they create, leading to physiological, cognitive, and emotional reactions that manifest in personal and social behaviors. Understanding this process of servicescape reveals its role and importance within the service environment and provides a foundational framework for researching user behavior in relation to servicescape [11-15].

2.3 Environmental Characteristics of Metaverse

Metaverse user experience is characterized by several key features that distinguish it from traditional digital environments. In the metaverse, service environments are revolutionized by features that create rich, dynamic user experiences [16-19]. The immersive nature of these virtual spaces allows consumers to engage with brands in a more profound way, fostering memorable interactions through three-dimensional settings that surpass the flat interfaces of old. Interactivity becomes a cornerstone, enabling hands-on engagements with virtual products and interactive customer service, which adds depth to the consumer journey. The persistent nature of the metaverse means services are always available, adaptable in real-time to user needs and business updates. User-generated content further enriches this landscape, where customer reviews and shared experiences build community and loyalty. While the virtual economy streamlines transactions within this space, personalized avatars provide a tailored approach to service, allowing users to express their identity and preferences, which service providers can leverage for customized assistance. Together, these elements craft a servicescape that is not only engaging and continuous but also personal and community-driven, heralding a new era for customer experience.

2.4 Thematic Content Analysis

Thematic Content Analysis (TCA) is a qualitative research method used for identifying, analyzing, and reporting patterns (themes) within data [20, 21]. Braun and Clarke define thematic content analysis as a technique for "identifying, analyzing, and reporting patterns (themes) within data." This method not only organizes and describes your data set in rich detail but often goes beyond by interpreting various facets of the research topic. Brown and Clarke argue that thematic analysis should serve as a fundamental method for qualitative analysis because "thematizing meanings" is a core skill common to qualitative analysis, applicable across diverse theoretical and epistemological frameworks.

This study adopted Thematic Content Analysis for getting depth of analysis for theoretical insights and identification of academic patterns of immersive 3D servicescape. This study aims to summarize the status of servicescape research and propose future academic challenges. TCA helps in identifying recurring patterns and themes within the data, which are crucial for understanding the current research landscape and emerging trends. Also, by focusing on themes, TCA provides a depth of analysis that goes beyond surface-level description. This is essential for capturing the multifaceted nature of user experiences and servicescape elements in the metaverse.

3. Research Methodology

The conventional TCA method involves several key steps: (1) Becoming familiar with the data, (2) Generating initial codes, (3) Searching for themes, (4) Reviewing themes, (5) Defining and naming themes.

In this study, Thematic Content Analysis is applied as follows:

- **Data Collection:** Data will be collected from a comprehensive review of existing literature on servicescapes and from focus group interviews with metaverse experts.
- **Generating initial codes and building a coding frame:** The collected data will be systematically coded to identify significant features related to the research questions.
- **Theme Development:** The codes will be collated into potential themes that represent key aspects of servicescape research and user experiences in the metaverse.
- **Review and Refinement (Experts focus group interview)**: The themes will be reviewed and refined to ensure they accurately represent the data and provide meaningful insights. Experts participation in the focus group interviews were selected based on their extensive experience in the VR/AR/XR and HCI domain with a minimum of 10 years of experience. Participants were recruited through email invitations or recommendations from research associations, resulting in a total of 5 experts. The interviews were conducted by online and offline depend on experts' condition. Key questions included research questions, and all interviews were recorded with the participants' consent and subsequently transcribed for analysis. To ensure the reliability of the study, all interviews followed the same questionnaire. The data analysis process involved multiple researchers/reviewers to perform cross-validation. Furthermore, to enhance the validity of the findings, participant validation was used.
- **Reporting:** The final themes will be defined and reported, providing a comprehensive overview of the current research landscape and future directions for servicescape research in the metaverse.

By employing Thematic Content Analysis, this study aims to provide a detailed and nuanced understanding of the evolving field of servicescape research, particularly within the immersive and dynamic context of the metaverse. This study conducted Inductive TCA with qualitative data analysis software ATLAS.ti 24.

4. Results

Phase 1: ***Data Collection***

The electronic databases searched in this review included original qualitative and quantitative papers published in Scopus and Web of Science. The journals were selected, as they were known to include either empirical studies or literature reviews related to immersive 3D servicescape studies. Searched query set was (“metaverse” OR “virtual reality” OR “vr” OR “virtual” OR “ar” OR “augmented reality” OR “augmented” OR “xr” OR “mixed reality” OR “immersive” OR “immersion” OR “telepresence” OR “extended reality”) and (“servicescape” OR “service scape”).

A number of further selection criteria were specified to include appropriate studies in the review. To be included in the review, papers were required to meet all the following inclusion criteria: (a) peer-reviewed articles/journals, (b) accessed via electronic search, and (c) written in English. According to these three conditions, 24 academic papers met the inclusion criteria and were identified as relevant to the current review.

Phase 2: ***Generating initial codes and building a coding frame***

After obtaining an overall understanding of the data, the researcher created an ATLAS.ti project and added all documents. To analyze the transcribed raw data, we utilized Glaser’s (1978) methodology, which includes open coding, selective coding, and theoretical coding. This process was conducted through iterative comparison, as illustrated in Figure 1. Initially, we extracted 327 open codes from the raw data.

The aim of the initial coding process was to label the topics which mentioned the following subjects: (1) the distinct definition or characteristics immersive 3D servicescape, (2) the theoretical or empirical analytic framework, (3) determinants or measurement criteria, (4) service context or service domain. The process of initial coding resulted in a list of 140 codes.

These were then refined through selective coding, where we prioritized important codes and removed duplicates, resulting in 65 substantial codes. These substantial codes were further analyzed and grouped into higher-level categories with interconnected meanings, leading to the identification of 15 theoretical codes, as outlined by Glaser. The detailed descriptions of these categorized codes are provided in Table 1.

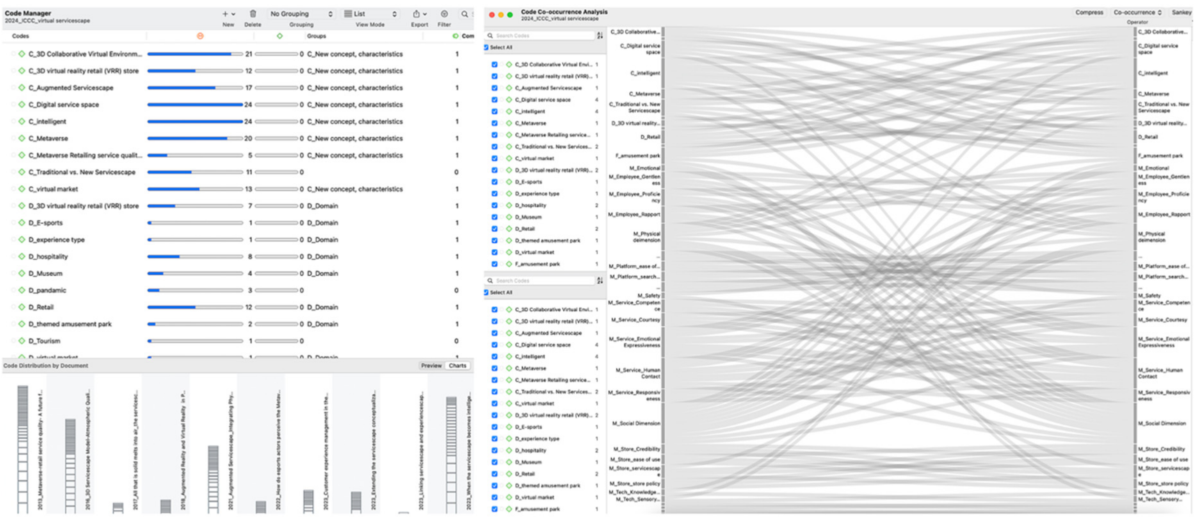

Figure 1. Screenshot of initial coding process for Immersive 3D servicescape

Phase 3: ***Theme Development***

In this phase of the study, Table 1 presents the organized results of a detailed coding process, with themes that reflect the evolving landscape of servicescape research in immersive environments. The table categorizes findings into three levels: Substantial Codes, Theoretical Codes, and Themes. These classifications highlight the diverse dimensions and unique attributes of 3D servicescapes in the metaverse.

4.1 Technical properties of Immersive 3D servicescape

Substantial codes such as “HMD” (Head-Mounted Display), “controller,” “avatars,” and “XR device and controller” lay the foundation for understanding the hardware and interactive features that facilitate immersion in the metaverse [22]. These elements are categorized into theoretical codes that define the new agent and user response, which represent how users navigate, interact, and personalize their virtual experiences. The resulting theme shows the critical technological and interactive properties that are setting 3D servicescapes apart from traditional environments [23-26].

4.2 Multifunctional applications of Immersive 3D servicescape

Immersive 3D servicescapes span various service sectors, with codes such as “virtual reality retail,” “e-sports,” “hospitality,” and “museum” environments [24], [25], [27-29]. These domains are aggregated into the theoretical code experience context—indicating the diverse ways that users engage with immersive environments based on their purpose, whether hedonic (entertainment-driven) or utilitarian (functionality-driven). This theme points to the versatility of immersive 3D servicescapes, illustrating their adaptability across different service contexts and their potential to deliver tailored user experiences.

4.3 Theoretical framework of Immersive 3D servicescape

Substantial codes such as “Supplier-Dominant Servicescape Design,” “Metaverse Retailing Service Quality (MR-SQ),” “Augmented Museum Servicescape,” “Hospitableness in Intelligent Servicescape,” and “Intelligent Healthscape Quality” represent specialized frameworks tailored to different service domains in the metaverse [30-32]. These codes are grouped under a broader immersive experience framework, emphasizing the need to adapt traditional servicescape theories for virtual environments. This theme compresses the importance of creating flexible, domain-specific frameworks that address the unique demands of retail, healthcare, cultural, and other sectors in immersive 3D environments. By doing so, it enables a more nuanced understanding of user experiences, aligning theoretical insights with the practical requirements of various service environments.

4.4 User behavior transition of Immersive 3D servicescape

Recognizing the expanding role of service staff, avatars, and interactive elements, the study identifies the need for a refined theoretical framework in the metaverse. Here, substantial codes include “Q&A chatbots,” “voice interaction,” and “haptic feedback.” These components combine under the theoretical code that addresses user behavior changes, highlighting how traditional customer service interactions transform within a digital, 3D space. This theme reflects the shift in user expectations and interactions in immersive environments, where real-time response and personalized avatars drive engagement and user satisfaction.

4.5 Enhanced and diversified measurements of Immersive 3D servicescape

Effective measurement of servicescape quality in the metaverse requires new metrics. Substantial codes like “accessibility,” “ease of navigation,” and “sensory properties” suggest that immersive environments need specific, adapted metrics to gauge user satisfaction accurately. These codes are consolidated under expanded metrics, a theoretical category that redefines traditional servicescape assessments by focusing on interactive elements unique to virtual experiences, such as loading speed and interactivity. This theme represents the new frontier in evaluating immersive servicescape experiences, where quality is measured by both sensory immersion and ease of use [30].

With the digital environment constantly evolving, security and privacy are now paramount in the virtual space. Substantial codes like “security,” “credibility,” and “privacy” form the backbone of emerging metrics that assess users’ trust and comfort in immersive servicescapes. Under the theoretical code user trust and credibility, these metrics ensure that virtual environments not only engage users but also provide secure, credible interactions. This theme emphasizes the importance of building trustworthy virtual spaces that respect user privacy and secure sensitive data.

Table 1. Theme development results for Immersive 3D servicescape

Substantial codes (65)	Theoretical codes (15)	Theme (5)
HMD Controller App (Application) Avatars Immersion Presence	XR device and Controller Platform New Agent New User Response	Technical properties
Metaverse Retailing Virtual Reality Retail (VRR) E-Sports	Service Domain Experience Context Hedonic / Utilitarian	Multifunctional applications

Hospitality Museum Amusement Park Tourism Intelligent Healthscape		
Supplier-Dominant servicescape design Metaverse Retailing Service Quailty (MR-SQ) Augmented museum servicescape Hospitableness in Intelligent Servicescape Intelligent Healthscape Quality	-	Immersive experience theoretical framework
Service staff (human) → Q&A, Chatbots → Avatar Moving to other space → menu bar, icon click → Haptic / Voice interaction Buying → icon click → Haptic / Voice interaction	Physical action → Online action → 3D action	User behavior transition
Hedonic / Utilitarian Tangible Functionality Prominence Aesthetic Personalization Emotional (customer, staff) Assurance	Metrics in the same concept as traditional servicescapes	
Accessibility Ease of Navigation Responsiveness Human Contact (Rapport, Proficiency) Service Competence Information Quality Servicescape	Metrics with expanded or different meanings based on traditional servicescape	Enhanced and diversified measurements
Platform Immersion Interactivity Ease of Use Sensory properties Search Capability Ease of Navigation Control	Emerging metrics in the metaverse servicescape (from a customer experience perspective)	
Loading Speed No Lag Engine Preset	Emerging metrics in the metaverse servicescape (from technical perspective)	Enhanced and diversified measurements
Security & Privacy Credibility	Emerging metrics in the metaverse servicescape (etc.)	

Phase 4 & 5: ***Review and Refinement, Reporting***

Based on the identified themes, insights into the definition, characteristics, application areas, and theoretical framework of 3D immersive servicescapes were summarized. These insights were then refined and organized through in-depth interviews with experts. The detailed analysis results are described in the following Discussion section.

5. Discussions

This study identifies critical themes in immersive 3D servicescape research, which have informed the framework for future academic exploration. Each of the five discussion points in sections 5.1 to 5.5 is derived from the thematic findings in sections 4.1 to 4.5, providing a logical progression from theoretical insights to practical challenges in the field of metaverse servicescapes. As a result of content analysis, future Immersive 3D servicescape research from the Metaverse user experience perspective can be summarized in the following five challenges.

5.1 Dynamics between Physical and Virtual Servicescapes

"Dynamics between Physical and Virtual Servicescapes" is based on the technical properties of immersive 3D servicescapes outlined in 4.1. As immersive environments incorporate physical elements and digital technology (such as HMDs and XR devices), the dynamics between these spaces become central to designing cohesive and engaging experiences.

Future research could investigate how the dynamic interactions between physical and virtual servicescapes can create synergistic user experiences. Understanding the nuances of how real-world settings inform virtual design, and vice versa, is crucial. This investigation could reveal new ways to create cohesive and engaging experiences that users can traverse seamlessly. For instance, a physical retail store's ambiance can inspire virtual store designs, enhancing user comfort and familiarity. Conversely, innovative virtual designs can be tested and refined in the metaverse before being implemented in physical spaces. This bidirectional influence could lead to hybrid servicescapes that leverage the strengths of both environments, providing users with a more integrated and holistic experience.

To elaborate, researchers could explore how sensory elements such as lighting, sound, and spatial arrangements in physical spaces can be replicated or enhanced in virtual environments. Additionally, virtual environments offer opportunities to experiment with features that are impossible in physical spaces, such as gravity-defying structures or interactive elements that respond to user actions in real-time. By bridging the gap between physical and virtual servicescapes, businesses can create a more cohesive brand experience, maintaining consistency across all touchpoints and fostering stronger customer relationships.

Moreover, understanding user expectations and preferences across these different environments can inform the design of more intuitive and enjoyable experiences. For example, a user accustomed to navigating a physical store may appreciate similar wayfinding cues in a virtual store. Future studies could also examine the psychological effects of transitioning between physical and virtual spaces, identifying factors that contribute to a seamless and satisfying experience.

5.2 Redefining Servicescape Measurements for the Metaverse

"Redefining Servicescape Measurements for the Metaverse" follows from multifunctional applications of immersive 3D servicescapes in section 4.2. The versatile application of 3D servicescapes across industries like retail, hospitality, and entertainment necessitates the development of new metrics that accurately measure user engagement, experience quality, and adaptability within these sectors. This redefined approach to metrics allows a better assessment of diverse, immersive service applications.

The advent of the metaverse necessitates a redefinition of traditional servicescape metrics. Unlike the existing internet environment (e-servicescape), the metaverse presents unique characteristics that require new measurement tools. These new metrics should measure the quality of virtual environments, encompassing factors such as virtual atmosphere, user autonomy, and the digital consistency of physical and virtual service elements. Traditional metrics like foot traffic and dwell time must be adapted to virtual contexts, where user engagement might be measured through interaction frequency, time spent in virtual spaces, and user feedback. Understanding how these metrics affect user behavior and satisfaction in the metaverse servicescape could pave a new way for improving user experience design, making it more intuitive and responsive to user needs.

Specifically, metrics like "virtual atmosphere" could involve assessing the immersive quality and sensory richness of the environment, while "user autonomy" might measure the extent to which users can personalize and control their experience. Digital consistency involves ensuring that virtual representations of physical service elements (such as product displays or customer service interactions) are coherent and reliable. Developing these new metrics will require interdisciplinary collaboration, drawing on insights from psychology, human-computer interaction, and digital marketing to create comprehensive and meaningful measurement frameworks.

Additionally, real-time analytics can play a crucial role in refining these metrics. By continuously monitoring user interactions and feedback, businesses can dynamically adjust the virtual servicescape to enhance user satisfaction and engagement. This iterative process of measurement and adjustment can help maintain a high-quality user experience that evolves with changing user expectations and technological advancements.

5.3 Evolving the S-O-R Framework

"Evolving the S-O-R Framework" builds upon the theoretical framework of immersive 3D servicescapes presented in section 4.3. Traditional servicescape frameworks like the S-O-R model require adaptation to accommodate interactive, bi-directional user engagement in virtual environments. This evolution acknowledges the need for more complex models that reflect the dynamic nature of user responses in immersive spaces.

The S-O-R (Stimulus-Organism-Response) framework must evolve to reflect the interactive nature of the metaverse. Future research should consider how stimuli in the metaverse are multi-faceted and how both environments and users can serve as stimuli to each other, creating a more complex web of interactions. This bi-directional influence challenges the traditional one-way S-O-R model, suggesting a more dynamic interplay where users and environments continuously shape each other. For example, a user's actions in a virtual store can influence the store's layout in real-time, which in turn affects subsequent user behavior. This evolving framework could help researchers and practitioners better understand user responses and the creation of more engaging and effective servicescapes.

To illustrate, in the metaverse, stimuli can include a wide range of elements such as visual aesthetics, interactive features, social interactions, and environmental feedback. These stimuli can trigger diverse organism responses, encompassing emotional reactions, cognitive processes, and behavioral intentions. The response, in turn, can influence the environment by modifying the user's virtual surroundings based on their interactions. This dynamic interplay necessitates a more nuanced understanding of how different stimuli interact and how they collectively shape user experiences.

Moreover, the metaverse allows for the incorporation of advanced technologies such as AI and machine learning to predict and adapt to user responses in real-time. Future research could explore how these technologies can enhance the S-O-R framework, enabling more personalized and adaptive servicescapes. By integrating user data and predictive analytics, businesses can create environments that respond proactively to user needs and preferences, thereby enhancing overall satisfaction and engagement.

5.4 Variability, Personalization and Adaptation

"Variability, Personalization, and Adaptation" extends from the user behavior transition in immersive 3D servicescapes discussed in section 4.4. As user interactions shift to include more personalized and adaptive features, immersive environments must account for real-time modifications and individualized experiences. This theme addresses how behavioral changes drive the need for environments that adapt to user preferences and contexts within the metaverse.

In the metaverse, immersive technology enables a high degree of variability and personalization of the environment. Variability allows for dynamic changes within the metaverse, offering users a wide range of experiences that can shift to match their preferences or situational needs. For instance, a virtual workspace can transform into a relaxing lounge with a change in user preference. Personalization enables users to tailor their virtual spaces and experiences, leading to more intimate and engaging interactions that resonate with their individual identities. Adaptation in the metaverse goes beyond static customization; it involves the environment's ability to evolve in real-time in response to user behavior. This means that as users interact with the environment, it continuously adapts, creating a personalized and immersive user experience. This dynamic and adaptive nature of metaverse environments can significantly enhance user satisfaction and engagement.

Additionally, the capability for real-time adaptation means that the virtual servicescape can evolve based on aggregated user data and trends. For example, a virtual retail environment can analyze purchasing patterns and adjust product placements or promotional strategies accordingly. This level of adaptability can create a more responsive and user-centric experience, catering to the individual needs and preferences of each user.

Moreover, the integration of AI and machine learning can further enhance personalization and adaptation in the metaverse. These technologies can analyze user interactions to predict preferences and provide tailored recommendations. For instance, an AI-powered virtual assistant could guide users through a personalized shopping experience, suggesting products based on their past behavior and preferences. This level of personalization can create a more engaging and satisfying user experience, fostering loyalty and repeat visits.

5.5 Domain Specific Approach

"Domain-Specific Approach" stems from the enhanced and diversified measurements of immersive 3D servicescapes explored in section 4.5. Given the varied purposes of extended reality environments (hedonic versus utilitarian), developing domain-specific strategies allows for tailored servicescape designs that align with specific user intentions and expectations. This final theme highlights the importance of contextual and domain-focused research to optimize the immersive user experience.

The aim and function of Extended Reality (XR), whether utilitarian or hedonic, significantly impact user behavior, customer journey, and the designed environment. Future research should identify the differences between servicescapes created for different purposes, examining how each type influences user engagement, satisfaction, and measurements. For example, a utilitarian servicescape designed for productivity (such as a virtual office) will differ greatly from a hedonic servicescape designed for entertainment (such as a virtual amusement park). This could lead to the segmentation of servicescape strategies tailored to specific user intents, whether they are logging in for work, socialization, education, healthcare, or entertainment. Understanding these differences can help create more effective and purpose-driven virtual environments that cater to the diverse needs of users.

For instance, a virtual office environment might prioritize features that enhance productivity and collaboration, such as seamless communication tools, customizable workspaces, and efficient workflow management systems. On the other hand, a virtual entertainment space might focus on immersive visuals, interactive elements, and social connectivity to enhance enjoyment and engagement. By recognizing these distinct requirements, researchers and practitioners can design servicescapes that are more aligned with user needs and expectations.

Furthermore, the impact of cultural and contextual factors on user behavior in different domains should be considered. Future research could explore how cultural differences influence user preferences and interactions in virtual environments, leading to more inclusive and globally relevant servicescapes. Additionally, the role of context-specific elements, such as regulatory requirements or industry standards, could be examined to ensure that virtual servicescapes comply with relevant guidelines and best practices.

6. Conclusion

This study summarizes the status of servicescape research on metaverse and proposes the academic future challenges that immersive 3D servicescape research should evolve based on literature review content analysis and focus group interviews with metaverse experts. As a result of the study, metaverse-related research in the field of servicescape has been proposed in five directions: dynamics between physical and virtual servicescapes, redefining servicescape measurements for the metaverse, evolving the s-o-r framework, personalization and adaptation of extended reality environment, and necessity of domain specific approach. The results of this study are expected to contribute greatly to expanding and developing servicescape research on the metaverse environment.

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