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Empirical Research Article

Metaverse Tourism: Elements and Consequences on Tourism Experience Journey

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Abstract

Prior research on Extended Reality (XR) has been a starting point for the development of the Metaverse. It is also a concern for researchers in the tourism field since it can enhance the tourist experience. Metaverse Tourism provides a virtual experience of the tourism destination for the users. It is potentially developed and predicted to be the future of tourism, enhancing the tourist experience through communication between humans and avatars and providing a new option for tourists to enjoy leisure activities. Recently, discussion on Metaverse tourism is still emerging, with some open talks from researchers in the intersections between information technology and tourism. This study extends prior studies by proposing six Metaverse tourism elements and categorizing them into core and supporting elements. Then, we analyze the consequences of those elements on the Tourism Experience Journey to enhance each stage with different characteristics. This study can contribute to continuing recent dialogues among scholars on how Metaverse can be applied in the tourism sector by proposing six elements that should be considered in developing and creating Metaverse services.

Keywords

extended reality; Metaverse Tourism; tourism experience journey; tourism services

1. Introduction

Metaverse has been starting to be very popular in the last ten years. The Avatar movie, released in 2009, introduced people to virtual technology and made it famous. The virtual realm is continuously developing by then. People can bring themself to the virtual realm and interact with others as if they are in the real world. It is called Metaverse, a 3D virtual world that can give us a different experience in the virtual environment through immersive technology, such as Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). Recently, it has been attracting considerable attention both from academicians and practitioners. This effect is more prominent due to some restrictions in the COVID-19 pandemic. As a result, people are becoming familiar with virtual tours and increasing the acceptance and adoption of Metaverse in tourism (El-Said & Aziz, 2022).

Tourism as defined by United Nations World Tourism Organization (2008):

> *A social, cultural, and economic phenomenon entails people's movement to countries or places outside their usual environment for personal or business/professional purposes.*

New Metaverse terms can be articulated into four typologies: AR, Lifelogging, Mirror worlds, and Virtual worlds (Smart et al., 2007) that can consist of a computing platform and avatars (Koo et al., 2022). In the 3D virtual world, Metaverse enables people to interact with others like in the real world using customized Avatars (Koo et al., 2022; Um et al., 2022). Metaverse has changed physical reality in tourism and combined all requirements in a 3D realm that brings the virtual environment to the real world. It will transform the internet into a parallel virtual world and enhance physical locations in the virtual world (Buhalis & Karatay, 2022; Buhalis et al., 2023b). Meanwhile, AR brings virtual objects into the physical dimensions. For instance, AR can help augment reconstruction processes and navigation in tourist destinations (Cauchi & Scerri, 2019; Gherardini et al., 2018). Hence, Metaverse Tourism development should consider social, cultural, and economic growth that provides leisure activities.

In the early development of the virtual world, users could not engage actively due to technology limitations and a lack of user acceptance (Um et al., 2022). However, with the recent internet and technology development, users' approval has been higher in the last decade, allowing people to access the Metaverse freely, engage with other users, and embody real-world experiences. This experience is enriched by digital sensory stimuli (Petit et al., 2019; Santoso et al., 2022) that make people feel human senses: vision, auditory, touch/haptic, smell, and taste in the virtual world. Furthermore, digital human sense will increase human perception since exposure to digital sensory stimuli is vital to stimulate the virtual environment (Ranasinghe et al., 2018). In addition, the increasing sensory modalities and engagement in the virtual environment will enhance users' sense of telepresence (Dinh et al., 1999; Ranasinghe et al., 2018).

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In the future, Metaverse Tourism will not complement existing tourism (Musil & Pigel, 1994), but it will be another option for tourists to experience the destination. The creative industry and recent technologies, such as Blockchain and Non-Fungible Tokens (NFT), will enrich the existing service encounters. Therefore, Metaverse Tourism will affect the Tourism Experience Journey, starting from pre-travel, on-site, and post-travel.

This paper extends prior literature (Buhalis et al., 2023b; Dwivedi et al., 2022; Dwivedi et al., 2023; Koo et al., 2022) on the current debate and discussion on Metaverse, especially the utilization in the tourism sectors. Recent studies on immersive experience mainly discuss the effect of VR (Flavián et al., 2019; Tussyadiah et al., 2017; Tussyadiah, Wang, et al., 2018), AR (Jung et al., 2018; Tussyadiah, Jung, et al., 2018), and Mixed Reality (MR) (Debandi et al., 2018; Teo et al., 2019) in a silo approach. On the contrary, Metaverse Tourism talks about the device and expands to the new virtual ecosystem that can offer a new direction for people to enjoy tourism.

This study wants to provide a general idea of Metaverse Tourism and analyze the different properties of Metaverse Tourism that will enhance the Tourism Experience Journey. Extant research in Metaverse Tourism also overlooks how to design Metaverse Tourism to align with the Tourism Experience Journey. To fill the existing research gap, we conducted this study. A design perspective can help create a user-friendly technology that can trigger customers' willingness to adopt Metaverse as a new direction to enjoy tourist destinations. The design perspective in Metaverse Tourism can also facilitate the creation of technology-ready users that can help tourists engage with tourism destinations and organizations (Buhalis et al., 2023a). In addition, we will extend our discussion to understand the consequences of each phase of the tourism experience.

This study aims to answer the following question: ***What essential elements should be provided in Metaverse Tourism to enhance the Tourism Experience Journey?*** And ***what are the consequences of those elements to the Tourism Experience Journey?*** First, this study would like to structure a topic by identifying critical concepts from prior literature and establishing a foundation for Metaverse Tourism features. Then, by illustrating the key elements, we explain the existing research knowledge on Metaverse Tourism, including the utilization of VR, AR, and MR for tourism. From this framework, we also derive a research agenda for further exploration in service research that explicitly accounts for practitioners' demand for practical implications.

This paper is organized as follows. First, we review prior studies on XR in tourism to understand the basic concept of Metaverse Tourism and what has been done in information technology and tourism, including human-computer interaction. Then, following the difference between Smart Service and Metaverse, we present the Metaverse architecture and what researchers have done with this technology so far. Next, we categorized these properties into core and supporting elements for Metaverse. Finally, we explain the consequences of those elements on the tourists' experience journey and provide further research exploration in the service context, mainly in tourism.

2. Literature Review

2.1 Metaverse and Tourism Technology

Metaverse development in the tourism sector starts with prior studies in XR (Debandi et al., 2018; Flavián et al., 2019; Tussyadiah, Jung, et al., 2018; Tussyadiah, Wang, et al., 2018), which can transform visitors' experiences. Santoso et al. (2022) found that primarily VR, with its capability to create a fully immersive environment, can enhance the pre-travel experience and increase tourists' intention toward the destination. In addition, VR can make sense of presence and brings enjoyment. Meanwhile, due to its ability to create interactive user interaction, AR is used during the on-site experience to overlay tourist information in a specific object. AR can help people learn about historical sites more interactively and intuitively. Finally, during the post-travel experience, prior studies mainly used VR to raise the memorability of tourists' on-site experience. As an outcome, it will increase the intention to revisit the destination.

As a 3D virtual realm, Metaverse can give tourists an experience economy (Jung et al., 2016) and provide the same sense as the real world. Metaverse in tourism offers an immersive environment and social interaction and embodies the experience of the real world. The virtual environment gives a transcendent space where people can express themselves through an avatar as an extended self (Belk et al., 2022; Belk, 2013). Metaverse's transcendental quality catalyzes other areas, such as tourism, marketing, and education, to perceive Metaverse as a new business model. Furthermore, it has extended the existing business model from a smart business and service into a metaverse business and service. In addition, it will also change the recent business models of tourism in the Metaverse (Greenwald, 2022).

Prior research on VR and AR for Tourism practices has yielded fruitful results. VR and AR have been adopted to enhance the tourist experience. Further, this kind of technology brings value co-creation practices to the tourism industry, collaborating with visitors on how VR and AR can be applied to create authentic experiences (Jung & tom Dieck, 2017). Metaverse tourism is beyond technology interfaces since it combines technology with ambient intelligence to bridge physical and virtual environments. It will create a holistic tourist experience from pre-travel, on-site, and post-travel. Gursoy et al. (2022) define Metaverse as:

> *The Metaverse is a collective, persistent, and interactive parallel reality created by synthesizing all virtual worlds to form a universe that individuals can seamlessly traverse. People can inhabit the Metaverse using digital avatars and experience the virtual world in multiple forms, including AR, VR, and MR.*

Metaverse in the hospitality and tourism sector is still emerging, requiring further involvement from practitioners and researchers to determine the mechanism above those conceptual frameworks. In the hospitality and tourism industry, Gursoy et al. (2022) propose a concept of Metaverse in the tourism sector:

> *Metaverse applications are revolutionizing the hospitality and tourism industry as virtual hotels, destinations, and tours alter how people select lodging and destinations, make bookings, and even attend concerts. Although the metaverse cannot replace in-person travel, improvements in technology and sophistication in the quality of virtual reality (VR), headsets have made metaverse hospitality and tourism apps increasingly immersive*

According to this proposed definition, Gursoy et al. (2022) emphasize how a novel virtual environment can attract tourists to enjoy the experience using VR headsets with fully immersive conditions and affordances. Metaverse Tourism offers tourists a chance to visit, connect, and enjoy the destination in the real and virtual worlds. For instance, a tourist can visit a virtual museum or virtual park in the virtual world, as shown in Figure 1 below. In this virtual environment, tourists can acknowledge entering a more substantive and immersive landscape and tourist attraction than ever before. Hence, this virtual environment can create a virtual experiencescape within the Tourist Experience Journey.

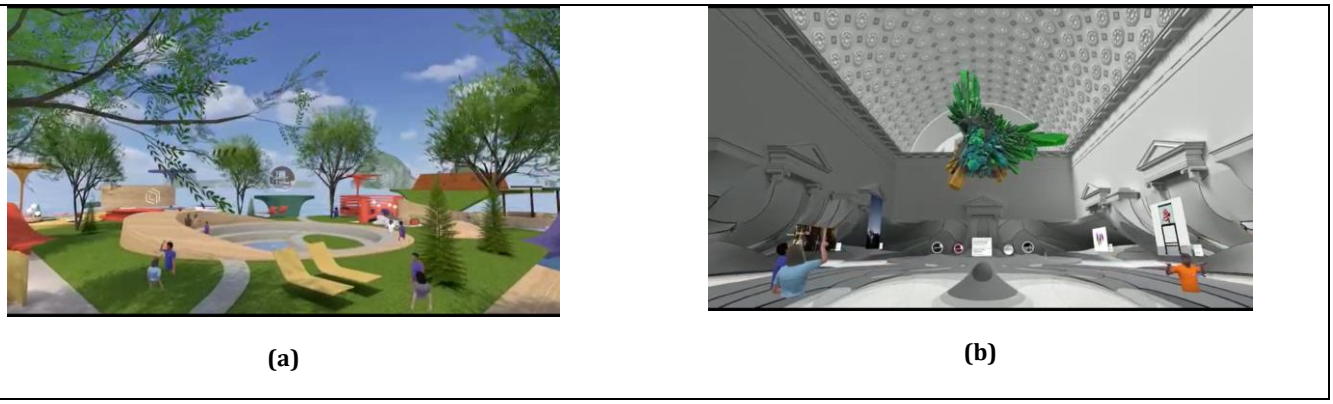

Fig. 1. Illustration of Metaverse Tourism in different virtual experiencescape: (a) Amusement park; (b) Museum

The development of Metaverse Tourism also enables the integration of some technologies to enhance the customer experience. However, the commercial and technological specifications vary because each entity that produces a virtual environment has access, membership, monetization, rights, and creative expression formats. For example, the development of Metaverse will open opportunities for integrating blockchain and Non-Fungible Tokens (NFT) to enhance the tourist experience. NFT, a type of cryptocurrency from Ethereum provides a creative direction to claim virtual/digital properties (Wang et al., 2021). Therefore, it might give tokenization of the entire experience journey and enable transparency and immutable characteristics for the tourist experience in Metaverse Tourism. Additionally, it will promote the growth of the creative economy by providing tourists with an authentic and unique experience that is different from the real-world tourist experience.

2.2 Metaverse Architecture

As mentioned in the previous section, to enhance the customer experience, Metaverse Tourism enables the integration of some technologies. Therefore, robust Metaverse architecture should be available and installed as an essential aspect of building Metaverse Tourism. Previous researchers have classified Metaverse architecture into several layers. For example, Jon Radoff proposed a seven-layered architecture of the Metaverse from bottom to top: infrastructure, human interface, decentralization, spatial computing, creator economy, discovery, and experience (Radoff, 2021). Architecture generally represents the industrial division. From the micro perspective, mainly in Metaverse Tourism, the Metaverse architecture, as illustrated in Figure 2, has three essential layers: infrastructure, interaction, and ecosystem (Duan et al., 2021).

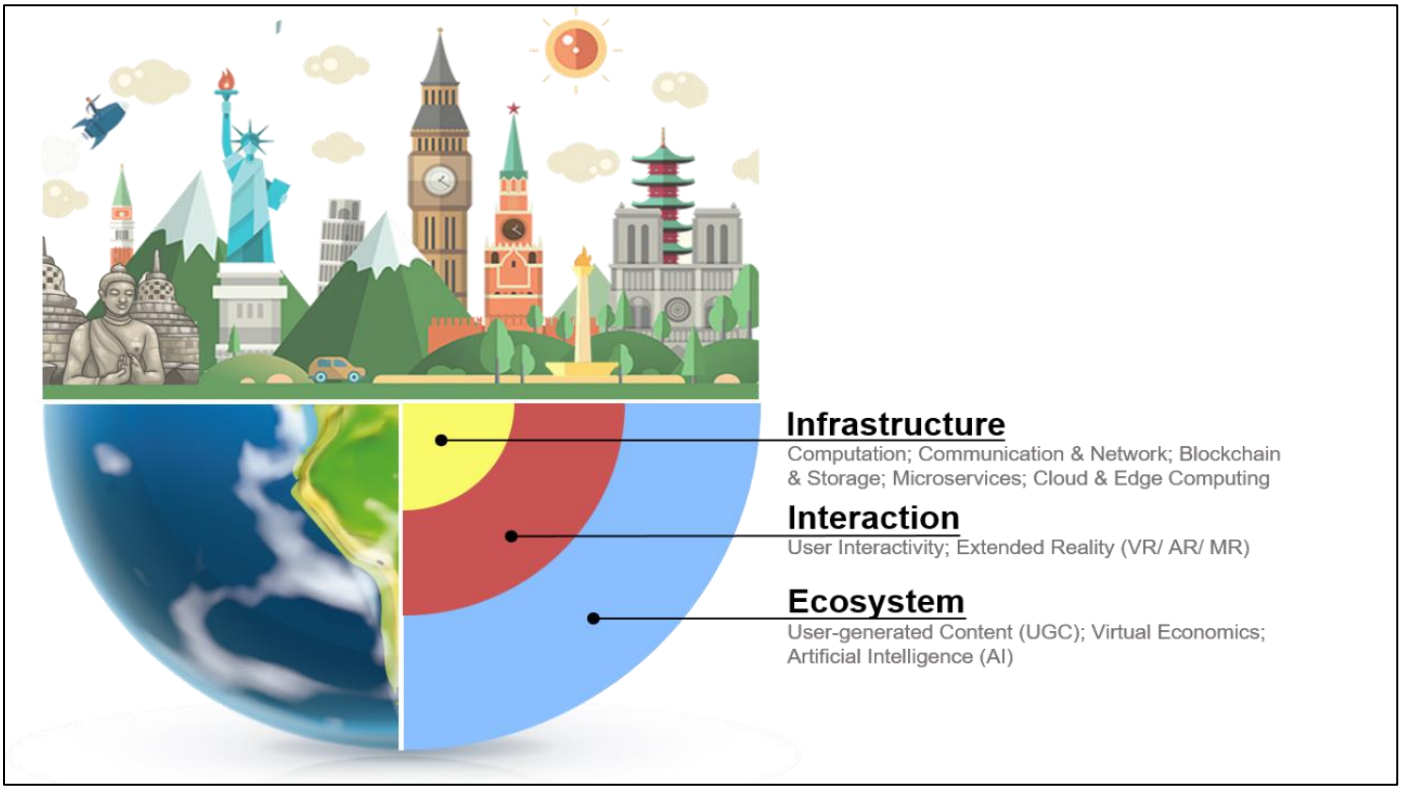

Fig. 2. Metaverse Layers (Adopted from Duan et al. (2021))

The infrastructure layer is the fundamental requirement for supporting the operation of a virtual world. This layer contains technology, enabling user devices (i.e., tourist destination management) to connect to the network and deliver content related to the physical world. Computation, communication & network, and blockchain & storage are important technologies of

the infrastructure layer (Duan et al., 2021). Computation is required to develop a large-scale multimedia system for Metaverse Tourism. At the same time, communication and networking are essential to make Metaverse Tourism accessible at any time and place (Duan et al., 2021). For example, 5G communication technology is necessary to allow many people to live in the same space, requiring wide bandwidth for a stable network connection (Park & Kim, 2022). Because Metaverse Tourism is expected to connect everyone worldwide, an enormous amount of data would be generated and stored in mass storage.

Furthermore, blockchain technology must be introduced to support sustainable ecosystem operation in the Metaverse to guarantee decentralization and fairness. It enables value exchange between software, self-sovereign identity, and new ways of unbundling and bundling content and currencies. Microservices, cloud computing, and edge computing are essential for developing Metaverse in decentralization (Lee et al., 2021; Radoff, 2021).

The interaction layer is critical for bridging the physical (i.e., real tourist places) and virtual worlds (i.e., Metaverse world). Enhancing knowledge is the core idea of travel and tourism, which can be gained by interacting with the world (Lee et al., 2021). Therefore, the interaction layer must be considered to increase the customer experience journey. There are two components: user interactivity and Extended Reality (XR) (Lee et al., 2021). User interactivity is needed to receive data from the physical world so that users or tourists can control their avatars (as representation) to finish corresponding actions in the Metaverse world. For instance, location-based services provide parasocial interaction in the virtual world, as depicted in Figure 3(a). Multi-modalities of human senses are considered when choosing the user devices to build a customer experience journey, including mobile, smart glasses, wearables, haptic, gesture, voice, and neural. Extended Reality (XR) is real-time 3D rendering-related technology, the primary interaction interface. XR encompasses AR, VR, and MR, in which all three "realities" share standard overlapping features and requirements, and each has different purposes, as mentioned in the earlier section. The parameters of physical devices can be collected by ubiquitous sensing technologies to maintain the same states as the corresponding digital twins. For reconstructing buildings, objects, and environments that exist in the tourist place, the 3D reconstruction approach is used to build realistic Metaverse Tourism (Duan et al., 2021; Navarro et al., 2017)

The ecosystem layer is a complementary element continuously required to serve users of Metaverse. This layer comprises user-generated content (UGC)/ content creation, creator/ virtual economics, and AI. The UGC is any form of content that users have created (i.e., Avatar) rather than the developers/operators of online platforms (Duan et al., 2021; Lee et al., 2021). Blockchain-based NFT provides a new approach to UGC in the Metaverse, certifying a digital asset as unique and not interchangeable. The virtual economy could offer rich content and a vibrant community in the Metaverse (Lee et al., 2021; Radoff, 2021). For instance, decentralized Finance, based on smart contracts and Fungible Token (FT), offers a way to innovate economic model transactions in Metaverse Tourism as depicted in Figure 3(b). AI-driven NPC is necessary to provide other computer-operated characters, such as enemies, partners, and support characters, with challenges, assistance, and help in the storyline of Metaverse Tourism. Social acceptability, security & privacy, and trust & accountability are supporting elements to develop a robust ecosystem of Metaverse (Lee et al., 2021).

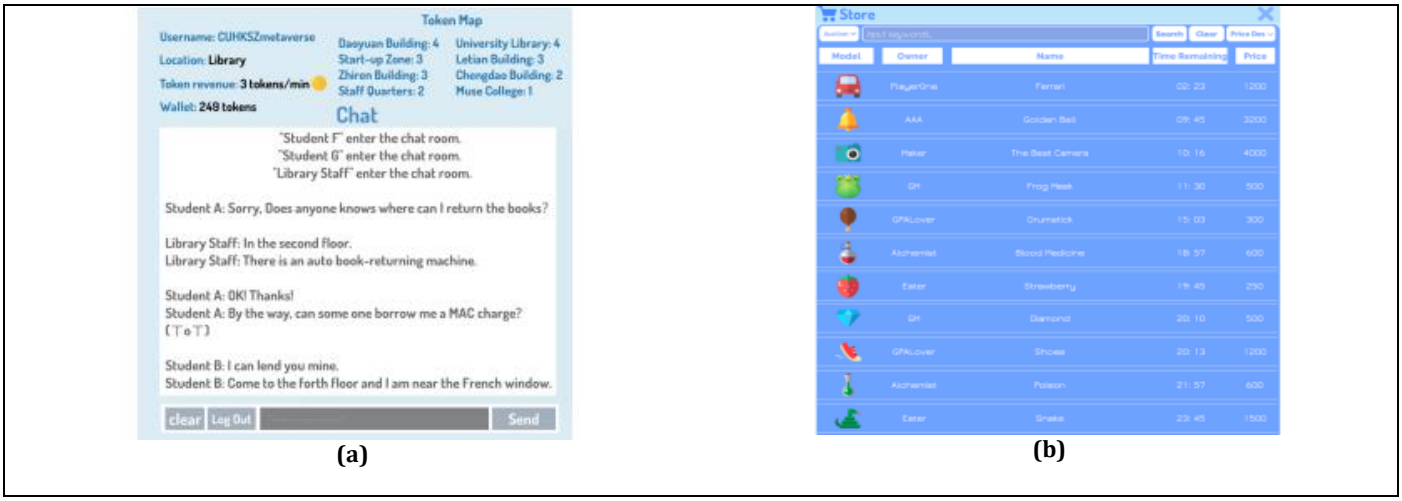

Fig. 3. Illustration of Metaverse architecture: (a) Location-based services in the interaction layer; (B) Trade and purchase services in ecosystem layer (Duan et al., 2021)

2.3 Overview of Tourism Experience Journey

Tourism experience is an accumulation of sequential steps the tourist follows, including pre-travel, on-site, and post-travel experience (Kim et al., 2012). As a result, tourists can gain memorable experiences, mainly from tourist perceptions and expectations (Kim et al., 2012; Larsen, 2007). The complexity of the Tourism Experience Journey can be seen through a holistic approach, ranging from anticipation during the pre-travel experience, going to the site, on-site experience, return from the site, and reflection on the post-travel experience. Therefore, tourists may have different experiences from the need for a vacation, planning the trip, interaction and participation on the site, and storing the experience (Godovykh & Tasci, 2020).

Volo (2009) defined experience as the reflection of energy from the environment, felt through human senses, processed, and categorized according to people's knowledge gained through time. Consequently, the experience will be retained in people's memory under certain conditions. Therefore, during the on-site experience, tourists will feel four experiences: affective, cognitive, sensory, and conation (Godovykh & Tasci, 2020) by enjoying the experiencescape. Affective experience relates to tourists' feelings and emotional state during the experience (Godovykh & Tasci, 2020). Cognitive experience refers to cognition, thoughts, education, information, and intellectual, rational, knowledge of the experience (Verhoef et al., 2009). Sensory has a close relationship with the human senses and sensation gained from the human senses (Volo, 2021). Finally, conative is related to tourist behavior, involvement, act, and practice accumulated during the experience (Godovykh & Tasci, 2020; Kim et al., 2012). Tourists store their impressions and memories at the end of the experience, plan to revisit, and recommend destinations to friends (Kim et al., 2012; Park & Santos, 2017).

3. Elements of Metaverse Tourism

In the following section, we would like to identify the properties of Metaverse Tourism. We categorized those properties as core and supporting elements, as shown in Figure 4 below. We defined a core element as a collection of properties that the platform owner and system developer should provide to fulfill the customers' needs and expectations. Meanwhile, a supporting element is a set or series of properties related to the Metaverse that enhance customer experience and satisfaction with using Metaverse Tourism. We identify three properties as core elements: sensory modalities, accessibility, and interactivity. Meanwhile, the Metaverse Tourism supporting elements are amenities, activities, and usability.

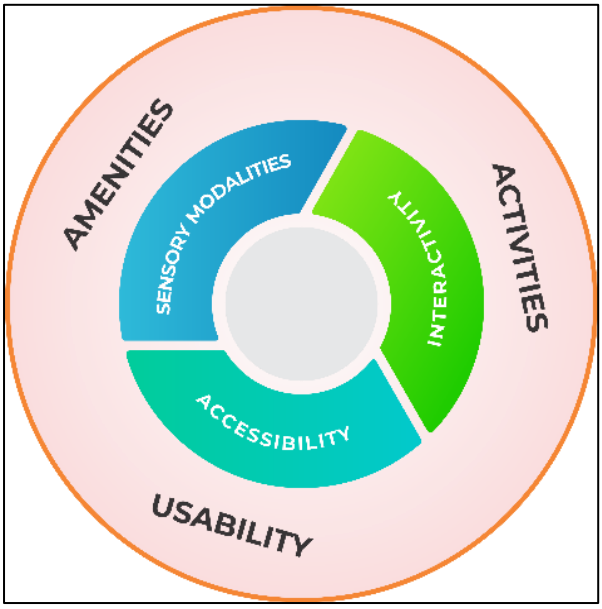

Fig. 4. Elements of Metaverse Tourism

3.1 Core Elements

3.1.1 Sensory Modalities

Enhancing the sensory modalities of tourists or users is one of the main elements for Metaverse Tourism to increase tourist experience, including user engagement, user perception, and sense of telepresence in a tourist destination. Digital sensory stimuli or multisensory technology is needed to accommodate this element (Petit et al., 2019; Santoso et al., 2022). Five human senses should be considered for building realistic Metaverse Tourism for tourists/ users, including visual, auditory, smell, taste, and haptic. XR is expected to be more seamlessly integrated into the tourism journey, enhancing tourists' interaction before, during, and after the trip. XR technology as an interaction layer can convey the perception of depth (for visual), which can replicate sight in physical environments (El Beheiry et al., 2019). It also offers sound spatial distribution (for auditory), which allows users to orient themselves and identify the directions of sound cues, a powerful medium for navigation and user attraction. Through motion controllers such as handheld input devices with a grip, buttons, triggers, and thumbsticks, tourists/ users can touch, grab, manipulate, and operate the virtual objects in Metaverse Tourism. In addition, haptic suits and gloves as wearables devices will also respond to haptic or touch (Maereg et al., 2017). Sensory modality streams (five human senses) are fused simultaneously in the game and can achieve remarkable realism, essential for impressive Metaverse Tourism. For instance, in thematic tourism such as port wine, tourists should expect to learn more by considering the five human senses in a virtual experience and significantly gain knowledge about port wine history, the manufacturing process, and warehouse procedure (Martins et al., 2017).

3.1.2 Interactivity

As one of the most popular tourism technologies in recent years, customers expect metaverse interactivity. Park and Kim (2022) defined interactivity as a multifaceted concept that has been explored under three research streams. Referring to Fortin and Dholakia (2005), the first research stream focuses on the functional features of interactivity by identifying prominent interactive features. In addition, the second stream focused on interactive actions and processes that include information exchange and responsiveness (Bezjian-Avery et al., 1998; Liu & Shrum, 2002). Finally, the last study emphasized the perceived interactivity regarding timeliness and engagement (Chung & Zhao, 2004; Liu & Shrum, 2002; Park & Kim, 2022). In brief, interactivity exchanges information between users and advanced tourism technology through some features.

In Metaverse Tourism, tourists expect that they can have some interactive features as technological affordances. For instance, interactive control to actively control digital avatars to enjoy visiting the destination can be considered a core element in Metaverse Tourism. Tourists, represented by a unique avatar, move from one object to another, understand the destination's information, and enjoy the experiencescape in Metaverse Tourism. Furthermore, through an avatar, tourists can interact and communicate with other tourists, tour guides, and destination management. Although it is crucial, the concept of interactivity in Metaverse is slightly different from real-world interaction. Metaverse Tourism can provide engaging interaction and communication, enrich parasocial interaction, and provide discussion topics to help people interact in the virtual environment.

3.1.3 Accessibility

Accessibility is also the main element of Metaverse Tourism and is related to the layer of infrastructure and interaction. Communication and network are critical factors in developing ease of access for the tourist/ user, which can sign in from everywhere to the ecosystem of Metaverse Tourism. The server generates the room or platform as a virtual world where a multi-user can enter it. To provide multi or cross-platform, for instance, web, desktop, and mobile users in the same space, the domain server connects with users (i.e., tourist and tourist destination management) over Web Real-Time Communication (Web-RTC) and User Datagram Protocol simultaneously. The Metaverse is envisioned as a 3D Internet, or Web 3.0 (Mystakidis, 2022). It is a stimulating new method of interactive contact between users and microcomputer devices (i.e., iPhone, iPod, Palm, PC tables, etc.) where the contents of the interactive systems for tourists/ users are stored. Web 3.0 Metaverse worlds have traditionally been constructed on blockchain computing platforms. A wide range of parties contribute to producing games and in-game products freely sold on the blockchain. It promotes the integration of the virtual world with financial payment methods. A token-driven ecosystem is a crucial component of a modern metaverse since it leverages blockchain-based tokens to offer a fair and transparent ecology, which are monetary representations for the community (Tönnissen et al., 2020).

All users can claim tokens indefinitely using smart contracts, limiting the number of tokens people can collect at a specific time. The manufacturing rate of the receipt may vary for each user based on their activities and performance in both the virtual and actual worlds to increase UX, according to the set regulations. The tokens can be utilized in various activities, such as trading in an official store, trading UGCs with other players, and voting (Duan et al., 2021). Good accessibility when designing the user interface

(UI) can affect the user experience (UX). Users with disabilities or older adults are examples of potential users (Yusril, 2020) for Metaverse Tourism, so the designing platform or UI should consider the universal design. There are six universal design principles: fair use, flexible use, simplicity, tolerance for error, low physical effort, and size & space for approach and use (Begnum et al., 2019). In addition, accessibility should be well-managed, balancing with privacy and security issues of the Metaverse (Di Pietro & Cresci, 2021).

Metaverse tourism is a virtual experiencescape where tourists and other actors interact virtually. Applications like social networking will find it simpler to obtain legitimate data in the metaverse due to the implementation of blockchain technology. The blockchain's distributed ledger technology will allow acquiring actual data and records as transactions. Each block in a blockchain contains a cryptographic hash of the block before it, a timestamp, and metadata. Every action in a blockchain is recorded as a transaction.

Moreover, connectivity between virtual and physical systems can be a Metaverse ecosystem component. It requires two-way connectivity, enabling users to bring their preferred models to life while keeping them in synchronization with the actual world. The metaverse's apps cannot function correctly without an initial connection between the real and digital worlds (Huynh-The et al., 2023). Blockchain can facilitate the interconnectivity between the physical and virtual world, including data storage, data privacy, and data security concern (Huynh-The et al., 2023) that can trigger enjoyable experiences.

3.2 Supporting Elements

3.2.1 Usability

Jeon (2021) explained that usability is the pragmatic functional performance of a Metaverse platform and is measured by three items: the service's usability, convenience, and practicality. Related to Metaverse Tourism, usability is a supporting element the designer should provide. Potential users have high expectations of using the technology easily without difficulties operating the system. Metaverse technology should consider the wide range of users' demographic characteristics, such as age, education, and financial background. Therefore, it is expected that users with any demographic background can enjoy experiencescape in the Metaverse.

In addition, the Metaverse technology for tourism has to offer convenience for users. According to Jeon (2021), users' convenience is essential by providing some features well shown through user interfaces. In addition, to increase their convenience of experiencing the experiencescape, the UI design should consider any factors that can reduce pain and cyber-sickness. The system should accommodate the needs of targeted users regarding the user interface. Moreover, the practicality of the service is also critical, especially for those who are trying this technology for the first time. Users will commonly enjoy the journey while getting an authentic experience when entering Metaverse. In brief, usability leads to a good first impression from the user about the design of the tools, which are user-friendly and highly compatible.

3.2.2 Activities

Destination management should provide activities tourists enjoy during the trip. There has been a discussion from prior studies on enhancing tourism activities and its innovativeness in tourism (Chang & Gibson, 2011; Korres, 2008; Rid et al., 2014; Uysal et al., 2016). Consequently, tourism activities can increase the quality of life (Uysal et al., 2016) and subsequent tourism behavior (Chang & Gibson, 2011). In addition, it can increase tourism area competitiveness by providing innovation for tourism activities (Korres, 2008). The connection between tourism activities and their consequences is embedded in the fully functioning tourism system. Therefore, tourism activities can benefit stakeholders, including destination management and tourists.

Gaining equal attention to real and virtual activities will be essential to achieving Metaverse Tourism's attractiveness and competitiveness. Moreover, we can create a different atmosphere for targeted tourists in the virtual environment. For example, we can offer street art activities to attract young adult travelers. Meanwhile, we can create a symphony orchestra to entertain older guests. With Metaverse Tourism, destination management can craft unique virtual offerings by providing a flexible service encounter and attraction, replacing the traditional perspective to see and enjoy the destination.

Moreover, the interactions in Metaverse Tourism can be enhanced by utilizing gamification. Gamification as a persuasive strategy to engage users through game-play mechanics to change the existing behavior (Hamari et al., 2014) can improve user relatedness and autonomy (Sailer et al., 2017). Prior studies use gamification for tourism and hospitality to promote and provide information during pre-travel experiences (on-site) (Bartoli et al., 2018). Combining activities with gamification might leverage tourists' psychological needs, evoke positive emotions, and increase destination loyalty. Therefore, blockchain technology in Metaverse Tourism can be a distinctive way to apply gamification in Metaverse Tourism compared to the real-world gamification process.

3.2.3 Amenities

Amenities are an important factor that plays an essential role in enhancing the user experience and improving customers' experience while using the facilities (Cobanoglu et al., 2011; Kim & Han, 2022). These studies stated that people would emphasize the general sense of well-being, reflecting the overall wellness and happiness of high satisfaction with life (Grzeskowiak & Sirgy, 2007). Prior researchers also consider amenities as one of the critical tourist criteria that affect tourist satisfaction and influence the decision to visit a destination (Han et al., 2018; Uysal et al., 2016). With amenities, tourists can have a leisure activity where tourists can relax and release their stress.

In Metaverse Tourism, amenities terms are similarly defined as leisure activity technology. The potential users of Metaverse Tourism expect an exclusive representation of their tourism object, supporting facilities, and surrounding environment. Therefore, the amenities should be well described. Amenities consist of facilities, services, and other features offered to the users. Facilities refer to the place and equipment provided for a particular purpose, while service is an intangible product that supplies the user's need. Related to the facilities, the designer and provider can offer any option hotels or villas, the nearest park, public areas or swimming pools, and additional accommodation such as a car or motorcycle to rent.

Moreover, the services that can be provided to the users include thematic and/or traditional clothes in the destination, local cultures like the people around commonly do, family photographs, and videos. These amenities can be aligned with the development of a creative economy in the interaction and ecosystem layers. Any particular creative actors and content creators can involve in enhancing tourists' experience. Further, it can reconnect and realign the physical and virtual dimensions of Metaverse Tourism. As a result, it can attract potential users and increases their interest. Additionally, it is expected to be a driver for future guests to decide whether they will visit the destination in the following days.

4. Consequences of Metaverse Tourism Elements to Tourism Experience Journey

Metaverse Tourism is distributed on the Tourism Experience Journey, starting from pre-travel, on-site, and post-travel experience (Koo et al., 2022). In the following section, we would like to understand how these elements can be implemented at different stages of the Tourism Experience Journey and its consequences to experience. The interaction between Metaverse Tourism elements and their repercussions on the Tourism Experience Journey can be seen in Figure 5.

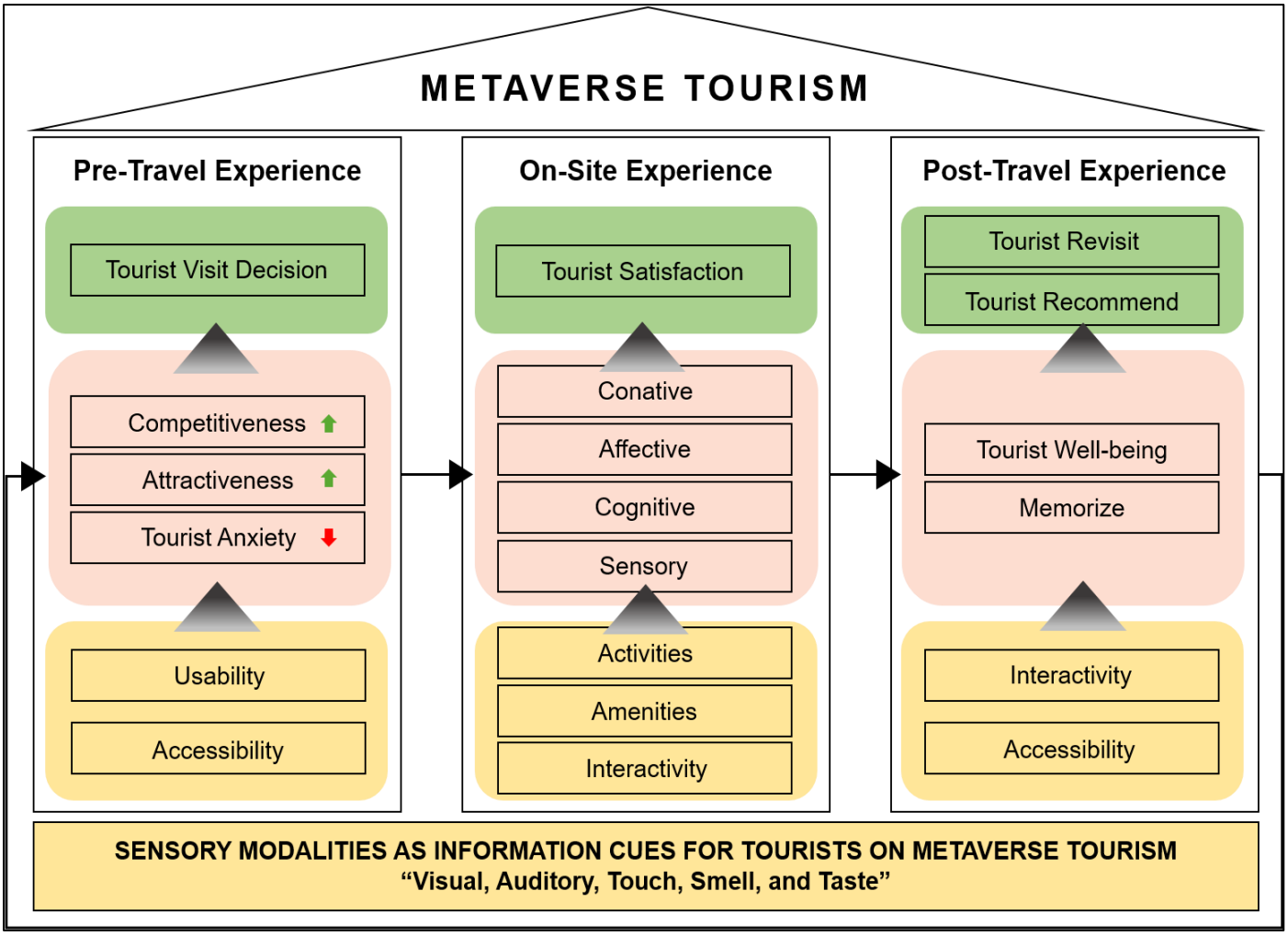

Fig. 5. Metaverse Tourism elements and tourism experience journey

Figure 5 illustrates how each element of Metaverse Tourism can be applied in each stage of the Tourism Experience Journey. We show two to three elements that dominate the design process of Metaverse Tourism. In addition, unmentioned elements do not mean we can ignore those elements in the designing process that influence tourist experiences. The yellow box indicates those pre-dominant elements in Tourism Experience Journeys.

Moreover, we also explain the consequences of pre-dominant elements in each stage on the tourist experience, as shown in the orange box. The consequences may increase some indicators and may loosen some negative indicators. For instance, in the pre-travel experience, good usability and accessibility might increase the competitiveness and attractiveness of Metaverse tourism and reduce tourist anxiety (such as worry about the experience). Lastly, we explain the outcome of each stage in the green box.

4.1 Pre-travel Experience Journey

As the core elements of Metaverse Tourism, sensory modalities can provide the tourist with some information. Sensory modalities can help tourists evaluate the destination by lowering anxiety and increasing relaxation and enjoyment (Villani et al., 2012; Vora et al., 2002). It might also influence the amount of information delivered to tourists since information cues on Metaverse Tourism mainly come from sensory properties (Koo et al., 2022). Furthermore, sensory modalities can support two other elements: accessibility and usability. As included in the accessibility element, NFT and UGC can be distinctive ways to promote Metaverse Tourism for prospective tourists. Meanwhile, the Metaverse Tourism elements' usability might help form a first impression about the device and interface of Metaverse Tourism.

Implementing NFT and UGC on the Metaverse ecosystem layer can help destination management promote the destination. NFT and UGC-based promotion for Metaverse Tourism can offer exclusive tangible products or real-life services (Chohan & Paschen, 2021). For example, Sony Enterprise has done contemporary practice to promote "Goosebumps 2: Haunted Halloween" by offering blockchain-based trading cards (Williams et al., 2018). Consumers who have trading cards can receive rewards from the company. As a result, this marketing campaign can increase the movie's authenticity and gain much attention from the targeted audience. A similar practice can be done with destination management to promote Metaverse Tourism.

NFT and UGC can help to promote Metaverse Tourism by providing information to prospective tourists. Thus, tourists can gain information, process it into knowledge, and form perceptions. NFT, as a unique and legal UGC, usually contains two sensory

modalities, visual and sound. Sensory-enabled technologies (Petit et al., 2019) might increase the number of human senses that appeal to the NFT. Enriching the sensory properties of NFT might improve tourist perception of Metaverse Tourism and trigger mental imagery. It can also offer tourists more realistic content. As a result, it can increase tourists' immersive experiences. Tourists can handle the worry and anxiety that might appear in pre-travel experiences (Larsen, 2007). In addition, embedding other sensory properties in NFT can evoke emotions (Chohan & Paschen, 2021). Evoking emotions in the pre-travel experience will play an essential role in activating tourist motivations and inputs for visit decisions (Prayag et al., 2013). Consequently, it might provide an attractive and innovative direction to promote Metaverse Tourism. Furthermore, it can affect Metaverse Tourism's competitive advantage.

Accessibility also should be managed effectively and efficiently, integrating the Metaverse platform with other devices. Therefore, tourists can easily access different devices on the interaction layer (see Figure 2). Accessibility in real-world tourism can influence destination attractiveness and competitiveness (Kastenholz et al., 2012). A similar effect might appear in Metaverse Tourism. Providing an easy access and interoperability platform, supported by good usability, might influence Metaverse Tourism's attractiveness and competitive advantage.

4.2 On-site Experience

On-site experience, tourists gain different kinds of experience, including cognitive, affective, sensory, and conative (Godovykh & Tasci, 2020). In Metaverse Tourism, tourists should have a similar experience as in a real-world situation. One of the critical elements of Metaverse Tourism to create this similar experience is sensory modalities in the virtual world. Digital sensory stimuli that can provide digital human senses in the virtual environment are essential elements during the on-site experience. These stimuli can enhance the immersive experience and offer a sensory experience on Metaverse Tourism. In addition, providing sensory modalities can increase the sense of presence in the virtual environment (Ranasinghe et al., 2018).

Sensory modalities in the virtual environment also effectively deliver information and reduce the user's cognitive load in the virtual environment (Wickens, 2002). Most information cues in the virtual environment are provided to tourists through sensory cues. For example, the size of the virtual object can be delivered by using haptic technologies, providing access for tourists to explore digital things by touching them. As a result, it can offer a more realistic virtual environment to interact with other actors.

Moreover, sensory modalities might also influence tourists' affective experience by inducing emotions in the human sense. For example, Rantala et al. (2013) provided digital information cues of valence and arousal through digital touching. In addition, psychology and emotional states can be induced in customers through interaction with a 3D virtual environment and objects (Li et al., 2001). Instead of affective experiences, Tourists can get some information regarding the 3D virtual environment and the things surrounding it. Tourists process information gained from sensory information cues into knowledge. As a result, Tourists can have cognitive experiences.

As on-site experience mainly happens on the interaction layer of Metaverse Tourism, it needs interactivity elements of Metaverse Tourism. Tourists and other users of Metaverse Tourism are represented by digital avatars, creating possibilities to communicate and enhance parasocial interaction. Avatars can visualize users' genders, physiques, outfits, gestures, and other characteristics as visual cues from tourists and other stakeholders. Furthermore, Avatar can be controlled by a human or an intelligent agent, called Non-Player Character (NPC). Realistic NPC is an essential component of the virtual environment that should have humanlike behavior (Lee, 2007). Prior studies found that NPC will affect users' emotional responses and increase the sense of telepresence (Lee, 2007). In Metaverse Tourism, providing NPC might be indispensable in enhancing affective and conative experiences. Consequently, it will provide a more engaging and authentic experience in the virtual environment.

Activities elements should support metaverse Tourism to enhance the interaction in the virtual environment. Attractive and innovative activities, combined with gamification mechanisms, can help tourists have more engaging activities. Furthermore, metaverse Tourism should provide flexible activities based on tourists' demographic characteristics and preferences. Moreover, Metaverse Tourism will support the development of the creative economy ecosystem. Therefore, enriching the on-site experience by providing additional amenities aligns with developing the creative economy ecosystem in the metaverse environment, supported by blockchain technology. For example, tourists might have different clothes to be used, combining virtual environments with digital clothing technologies. Another example, tourists might have digital assets in Metaverse Tourism that can be bought and sold through trade and purchase services in the ecosystem layer (see Figure 3(b)). Combining interactivity, amenities, and activities might help increase tourist satisfaction and memorable experiences.

4.3 Post-travel Experience

During the post-travel experience, tourists remember the experience and have a post-travel reflection. To recognize and memorize the experience, tourists need stimuli. Therefore, Metaverse Tourism should provide sensory stimuli. NFT, as included in the accessibility elements, can be an innovative technology to collect the tourist experience. NFT is embedded with timestamps and can describe a unique experience on a particular date. Therefore, NFT can save and memorize memorable tourist experiences from pre-travel to on-site experiences. In addition, NFT, enhanced by sensory modalities, can be a stimulus to recall unique memories about the activities (Brady et al., 2011).

NFT can stimulate mental imagery by offering visual stimuli to raise perceptual reenactment of previous experiences. Furthermore, providing visual stimuli through NFT can trigger the process of visual information that holds information and manipulates it to perform cognitive tasks. As one of the core elements of Metaverse Tourism, sensory modalities can enrich tourists' information about pre-travel and on-site experiences. For example, the smell of coffee can help tourists remember the museum experience since it plays an essential role in the setting of a museum or art gallery (Spence, 2020). Consequently, it can increase tourists' intention to revisit since tourists expect to gain similar experiences with the prior ones.

A tourist might reflect on the effect of Metaverse Tourism on well-being, both hedonic and eudaimonic. Therefore, NFT might help tourists to remember the existing experience. Furthermore, extended reality as a part of the interaction layer on Metaverse Tourism might help to provide rich visual stimuli by providing an immersive environment. Thus, it can make tourists memorize cognitively and affectively (Xi et al., 2021). In addition, NFT also can help to promote Metaverse to other tourists. Combined with interactivity elements, it can be a creative direction to promote the destination by recommending it to other tourists. In addition, tourists can sell their NFT to others, provoking others to visit the destination.

5. Conclusions

Recently, the technological advancements of XR have been an excellent start to understanding the implication and practical issues of the virtual environment. With the emergence of Metaverse, it could be a new direction to enter a new era to bridge

the physical and virtual environment. Excellent and deep knowledge of Metaverse can be a solution to create a completely holistic and digital experience. This paper provides core and supporting elements that can be considered in designing and developing Metaverse Tourism. We propose three core and three supporting elements that service designers can be regarded as while developing Metaverse tourism. We extend our concept on how to apply these elements to a specific Tourism Experience Journey stage. Metaverse will be a critical solution for the hospitality and tourism industry to serve customers better, keeping would-be customers interested. At the same time, Metaverse Tourism will be an option for the hospitality and tourism industry to raise and recover from the impact of the COVID-19 pandemic.

Although the conceptual background of Metaverse tourism is still infancy, this paper tries to extend recent discussions and debates on the utilization of this emerging technology. Proposing an excellent and deep knowledge of Metaverse can be a solution to create a completely holistic and digital experience. In the tourism sector, Metaverse can be a new direction for tourists to enjoy fun and pleasurable moments with the virtual environment and objects. Further, Metaverse tourism can be an alternative to promote cities, locations, and events to other tourists and actors. Metaverse can be combined with other technologies to enrich tourists' experience and understand users' behavior, including blockchain, AI, and digital clothing.

But, the development of the virtual environment has been entering a new era by introducing Metaverse to capture a virtual world and extend the physical reality. Excellent and deep knowledge of Metaverse can be a solution to create a completely holistic and digital experience. In Tourism, Metaverse will be an option for leisure activities, creating possibilities to build Metaverse Tourism. Metaverse Tourism will develop new ways to promote cities, locations, and events to other tourists and actors. As the device interacts in the virtual environment, XR can get more accustomed to this technology. Moreover, Metaverse can be combined with other technologies, such as blockchain and digital clothing, to enhance the tourist experience.

5.1 Limitation and Future Research Direction

This paper provides conceptual background to analyze six properties of Metaverse Tourism. To discuss the limitation of the article, we discuss it based on Metaverse architecture, mainly focusing on the interaction and ecosystem layer. In the ecosystem layer, The successful introduction of Metaverse Tourism might depend on the value created for tourists and platform owners. It might also destroy the existing value of tourism practices. Although it is important, prior studies have not discovered this phenomenon. Therefore, it might be beneficial for service researchers to understand the value of co-creation and co-destruction of Metaverse Tourism to the existing tourism practices (Akaka & Vargo, 2014). Metaverse Tourism might develop a new tourism business model in the ecosystem layer of metaverse architecture, providing a new service to tourists. Therefore, future studies can understand the suitable business model for Metaverse Tourism to deliver the service. Furthermore, future research can understand how to manage and govern the creative economy in Metaverse Tourism and how this ecosystem can grow with innovative capabilities from its network actors. The ecosystem's generativity might be suitable for understanding the mechanism elaborating future studies for ecosystem platforms in the service era (Thomas & Tee, 2022).

The second part of the limitation is on the interaction layer. This study does not consider virtual loneliness in the virtual environment. Since XR brings tourists to a new and immersive environment, it might affect tourists' interpersonal. Feeling lonely motivates people to interact and communicate with others. In addition, it can trigger subsequent behavior and cognitions to reinforce their loneliness. Although it often appears in the virtual environment, people might feel more lonely in the real world than in the virtual environment (Martončik & Lokša, 2016). Tourism as a means to escape from daily routines should combat loneliness. Therefore, Metaverse Tourism should also consider loneliness to provide a reasonable quantity and quality of social interactions. Therefore, we need future research to understand the effect of Metaverse Tourism on tourist loneliness. Can interaction and communication in the virtual environment lower the degree of tourists' loneliness? In addition, can NPC help boost this interaction and communication in the virtual environment?

Service failure and recovery can also be important issues for further exploration, which are not discussed in this paper. As the hospitality and tourism industry is characterized as a *"people business"* (Kim et al., 2010), it might be essential to understand the underlying mechanism of service failure and how to handle it in Metaverse Tourism. For example, tourists might attach significantly more value not to losing than winning. Consequently, it might raise negative feelings after a service failure much stronger. Furthermore, Metaverse Tourism is a unique environment for service recovery since it has no direct interaction. Therefore, it might be beneficial to understand the mechanism of service failure and recovery in the virtual environment. For example, how many tourists experience failure in the virtual environment, and what emotions might appear in this situation? Does it affect other tourists? What kind of interaction and mode of communication should be conducted to enhance parasocial interaction and effectively handle failure in the virtual environment?

5.2 Theoretical Contribution

This study extends current discussions on the application of Metaverse in the business contexts (Ahn et al., 2022; Buhalis et al., 2023b; Dwivedi et al., 2022; Dwivedi et al., 2023; Giang Barrera & Shah, 2023; Koo et al., 2022). In this conceptual paper, we bring some design and user interface components in developing Metaverse tourism with some considerations on three layers of Metaverse architectures. XR technology mainly happens on the interaction layers of the Metaverse universe. Therefore, this study tries to broaden the discussion by analyzing the underlying elements and how they can be applied to different stages of the Tourism Experience Journey. As a result, these elements might be beneficial for tourists in receiving fun, authentic, and enjoyable experiences in Metaverse tourism.

5.3 Practical Contribution

This study also contributes practically by offering the elements of Metaverse Tourism that platform owners should consider. The identified core and supporting elements can guide the Metaverse Tourism design. As a result, it can maximize tourism experiences and enjoyment. Second, this study extends prior studies on the holistic approach to tourist experiences in the 3D virtual world (Santoso et al., 2022). In addition, this study provides some key features to enhance tourist experiences in Metaverse Tourism that might be useful. On the other hand, destination management can understand what should be provided for Metaverse Tourism and the consequences of those elements.

Declaration of competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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