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The future of travel in the metaverse: landscape and use cases

Working Group 2: Applications & Services

Technical Report ITU FGMV-36

The future of travel in the metaverse: landscape and use cases

Summary

This Technical Report provides an in-depth background and a comprehensive view of the emerging nexus between the metaverse and tourism. This report highlights current tourism trends, devices used to enable the metaverse and explore promising areas of tourism. A comprehensive section of use cases, including case studies of successful implementations, provides practical insights into how the metaverse is being utilized for tourism around the world. This report also explores standardization issues of the metaverse in tourism, highlighting adoption challenges, security concerns and economic and social implications.

Keywords

Metaverse, tourism, use cases, augmented reality, virtual reality, digital twin, immersive experience, information and communication technologies (ICTs).

Note

This is an informative ITU-T publication. Mandatory provisions such as those found in ITU-T Recommendations, are outside the scope of this publication. This publication should only be referenced bibliographically in ITU-T Recommendations.

Change Log

This document contains Version 1.0 of the ITU Technical Report on "*The future of travel in the metaverse: landscape and use cases*" approved at the 7th meeting of the ITU Focus Group on metaverse (FG-MV) held on 12-13 June 2024.

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Additional information and materials relating to this report can be found at: https://www.itu.int/go/fgmv. If you would like to provide any additional information, please contact Cristina Bueti at tsbfgmv@itu.int.

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1 Scope

This Technical Report provides an in-depth background and a comprehensive view of the emerging nexus between the metaverse and tourism. The report highlights current tourism trends, devices used to enable the metaverse and explore promising areas of tourism. A comprehensive section of use cases, including case studies of successful implementations, provides practical insights into how the metaverse is being utilized for tourism around the world. The report also explores standardization issues of the metaverse in tourism, highlighting adoption challenges, security concerns and economic and social implications. The objective of this report is to highlight the potential of the metaverse for tourism globally, exploring the key opportunities and challenges associated with the adoption of this emerging technology in the tourism sector and address standardization gaps.

2 Reference

None.

3 Terms and definitions

3.1 Terms defined elsewhere

This Technical Report uses the following terms defined elsewhere:

3.1.1 artificial intelligence [b-ISO/IEC 2382]: Interdisciplinary field, usually regarded as a branch of computer science, dealing with models and systems for the performance of functions generally associated with human intelligence, such as reasoning and learning.

3.1.2 asset [ITU-T X.1400]: Representation of value.

3.1.3 augmented reality (AR) [b-ITU-T P.1320]: An environment containing both real and virtual sensory components. The augmented reality continuum runs from virtual content that is clearly overlaid on a real environment (assisted reality) to virtual content that is seamlessly integrated and interacts with a real environment (mixed reality).

3.1.4 blockchain [ITU-T X.1400]: A type of distributed ledger which is composed of digitally recorded data arranged as a successively growing chain of blocks with each block cryptographically linked and hardened against tampering and revision.

3.1.5 digital twin [b-ITU-T Y.4600]: A digital representation of an object of interest.

3.1.6 Internet of things (IoT) [b-ITU-T Y.4000]: A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.

3.1.7 interoperability [b-ITU-T Y.101]: The ability of two or more systems or applications to exchange information and to mutually use the information that has been exchanged.

3.1.8 nonfungible token (NFT) [b-ITU-T X.1400]: An entirely unique digital representation of an asset.

3.2 Terms defined in this Technical Report

None.

4 Abbreviations and acronyms

This Technical Report uses the following abbreviations and acronyms:

AI	Artificial Intelligence
AR	Augmented reality
DLT	Distributed Ledger Technology
DID	Decentralized Identity Management
ESG	Environmental, Social and Governance
FG-MV	ITU Focus Group on metaverse
ICT	Information and communication technology
IoT	Internet of things
MR	Mixed Reality
m-WoM	Meta-word-of-mouth
NFTs	Non-Fungible Tokens
NGOs	Non-governmental organizations
PII	Personally Identifiable Information
RBAC	Role-Based Access Control
SDGs	Sustainable Development Goals
UGC	User-generated content
VR	Virtual reality
XTM	Tourism metaverse
2FA	Two-Factor Authentication

5 Conventions

None.

6 Background

In a world where the metaverse presents a USD 20 billion opportunity [b-McKin], the future of tourism is set to undergo a revolutionary transformation. As innovative formats gain mainstream acceptance, it is anticipated that the emergence of hybrid offerings that seamlessly blend virtual and physical travel experiences will revolutionize the way people explore and interact with destinations, providing a more immersive and flexible approach to travel.

The metaverse is already being utilized within the tourism industry for a variety of applications and has the potential, to impact the industry in the coming years deeply. Looking to the future, younger generations may expect the metaverse to be utilized by tourism and hospitality companies to enhance their experience. A recent survey conducted in Italy, revealed that Generation Z (born between 1997 and 2004) respondents would use, metaverse for their travels, if they had the opportunity, with 93 per cent of respondents arguing that a trip into the metaverse should cost less than a real trip [b-ESI]. Although to a lesser extent, sentiment is also positive among tourism executives as a survey conducted

by Accenture revealed that 53 per cent of executives believe the metaverse will have a positive impact on their organizations [b-Accenture].

For the purpose of this report, the definition adopted for the term "metaverse tourism" is: "…tourism that provides a product or experience with collective spatial environments enhanced by multi-sensory information processing in the convergence of physical and virtual environments." [b-Go]. In other words, the fundamental product offered to all tourists, namely the 'travel experience' is synergized with the metaverse in a manner that augments this product beyond the previous capabilities of traditional tourism [b-Ambolis].

7 Tourism Trends

7.1 Current state of the tourism industry

The tourism industry is undergoing a transformative phase, characterized by adaptive responses to global socio-economic shifts and technological advancements. Current data indicates a robust recuperation from the downturn induced by the global health crisis, with projections suggesting a near-complete resurgence [b-McKin]. This recovery is, however, uneven across regions, with Asia–Pacific markets lagging due to lingering travel restrictions.

A critical concern is the pervasive labour deficit, precipitated by the exodus of skilled personnel during the pandemic's peak. The industry faces the dual challenge of replenishing its workforce and mitigating the attrition of experienced staff to other sectors.

There is a heightened emphasis on sustainable practices within the industry, driven by regulatory mandates and consumer advocacy for environmental stewardship. Tourism operators are thus recalibrating their offerings to align with eco-friendly and socially responsible standards.

Tourism entities are increasingly leveraging digital platforms to enhance customer experiences and streamline operations. The integration of virtual reality (VR) and augmented reality (AR) technologies is redefining engagement paradigms, allowing for immersive exploration of destinations.

The industry's forward-looking strategies are centred on harnessing data analytics for predictive modelling of travel patterns, optimizing resource allocation, and personalizing marketing efforts. The goal is to create resilience against future disruptions and to capitalize on the burgeoning demand for experiential travel.

7.2 Emerging trends in tourism

In an era of rapid technological evolution and shift consumer needs, the tourism industry is undergoing significant changes. Emerging trends such as experiential and sustainable tourism along with new digital trends are redefining and setting new benchmarks for this industry.

7.2.1 Experiential tourism

This trend emphasizes the transition from passive sightseeing to active engagement, where travelling seek immersive experiences that foster a profound connection with the destination's culture, history and environment [b-NG]. Experiential tourism is gaining traction as it offers travelling authentic encounters, enabling them to forge personal narratives and memories beyond conventional tourism offerings.

7.2.2 Sustainable and Regenerative tourism

With an increasing global emphasis on environmental protection and social equity, sustainable tourism is emerging as a critical focus area. This approach balances the needs of tourists with those of the environment and host communities, aiming to minimize negative impacts while enhancing the positive contributions of tourism to society [b-UNDESA]. Sustainable tourism practices are becoming integral to the industry's long-term viability, ensuring that destinations can thrive without compromising ecological integrity or cultural authenticity [b-UNESCO]. In recent years, the focus on avoiding negative – unsustainable – impacts of tourism have been accompanied by an emerging focus on its positive counterpart: highlighting the regenerative power it might have for the concerned communities.

7.2.3 Digitalization in tourism

Tourism was one of the first sectors to digitalize business processes on a global scale with flight and hotel bookings online [b-UNWTO]. As information and communication technologies (ICTs) gained widespread traction, the tourism industry emerged as an early adopter of technologies and digital platforms. Today, the digital transformation of the tourism industry is still accelerating, with advancements in technology streamlining travel experiences and operations [b-UNWTO]. From online bookings to virtual tours, digitalization is enhancing the efficiency and accessibility of tourism services. Moreover, it enables personalized experiences through data analytics and artificial intelligence, catering to the evolving preferences of modern travelling. Furthermore, the impact of digitalization, including the emerging metaverse, extends across all stages of the tourist experience: pre-travel, during travel, and post-travel. This entails the integration of digital platforms for itinerary planning, immersive travel experiences utilizing augmented reality (AR) and virtual reality (VR) technologies during journeys, and leveraging digital memories captured to influence future travel decisions and bookings.

7.3 Impact of metaverse on tourism

The metaverse introduces a novel dimension to tourism, offering virtual experiences that go beyond physical boundaries. It enables users to explore destinations in a three-dimensional space, providing a sensory-rich simulation of travel [b-McKin2]. This virtual exploration is not confined to visual stimuli; it also encompasses interactive elements that engage other senses, offering an experience more similar to physical travel.

7.3.1 Market expansion and accessibility

Technological advancements in the metaverse are democratizing access to travel experiences. Individuals who are unable to travel due to financial, physical, time or other constraints can now visit destinations virtually that they would otherwise not experience. This expansion is not only increasing the market reach for tourism operators but also fosters inclusivity within the industry [b-springer].

7.3.2 Enhanced consumer engagement

The metaverse allows for deeper consumer engagement through personalized and interactive marketing strategies. Tourism businesses can create bespoke experiences that cater to individual preferences, thereby enhancing customer satisfaction and loyalty. The ability to preview destinations and activities in the metaverse can also significantly influence decision-making processes for potential travelling [b-ELSEVIER].

7.3.3 Operational Efficiency

The integration of metaverse technologies streamlines various operational aspects of the tourism industry. From virtual booking systems to AI-driven customer service, the digital infrastructure supports efficient management and scalability. Moreover, the use of digital twins, virtual replicas of physical entities, enables precise planning and resource optimization [b-ELSEVIER].

8 Emerging technologies that enable metaverse tourism

The metaverse is underpinned by a suite of emerging technologies that collectively construct a comprehensive and immersive virtual travel experience.

8.1 Augmented reality and virtual reality

AR and VR are transformative technologies in the metaverse. AR enhances the real world by overlaying digital content such as images and information, onto our physical surroundings. This can be experienced through devices like smartphones or AR glasses.

VR, on the other hand, immerses users in a completely virtual environment, often using headsets that block out the physical world and replace it with a computer-generated one [b-McKin2]. In tourism, these technologies can offer virtual tours of destinations or historical sites, providing an immersive experience without the need for physical travel.

8.2 Blockchain and non-fungible tokens

Blockchain, or distributed ledger technology (DLT) is a secure, decentralized ledger that records transactions across multiple computers [b-ITU-T X.1400]. In the metaverse, it's used to ensure that transactions, like the purchase of virtual goods, are secure and transparent [b-waka]. Non-fungible tokens (NFTs) are unique digital assets verified on a blockchain, which can represent ownership of virtual items such as artwork or real estate in the metaverse [b-IGI]. They play a key role in the digital economy of the metaverse tourism, allowing users to own and trade unique assets.

8.3 Digital twins

Digital twins are accurate virtual representations of physical objects or locations. They are used in the metaverse to digitalize real-world environments, which can be particularly useful for virtual tourism. Users can explore and interact with these digital replicas of cities, landmarks, or natural wonders, enhancing the virtual travel experience,

8.4 IMT-2020/2030

The next generations of wireless technology, IMT-2020/2030, also known as 5G /6G mobile, provides the high-speed, low-latency connectivity that the metaverse requires. They enable quick data transfer and real-time interactions, which are crucial for a smooth and responsive virtual experience [b-springer]. For tourists in the metaverse, this means being able to explore virtual worlds without lag or interruption.

8.5 Edge computing

Edge computing processes data closer to where it is being generated, which in the case of the metaverse, means near the user. This reduces the distance data has to transfer, decreasing latency and improving the speed of interactions. For virtual tourism, edge computing can make experiences more seamless and realistic.

8.6 Internet of things

Internet of things (IoT) devices gather and send data that can be integrated into the metaverse to make virtual environments more lifelike. For instance, sensors can collect environmental data that adjusts the virtual weather to match the real world, or track crowd movements at a tourist attraction to replicate them virtually [b-block].

8.7 Cloud computing

Cloud computing provides the infrastructure necessary to support the vast amounts of data and complex processing the metaverse requires. It allows for scalable, on-demand resources that can support the dynamic needs of virtual tourism platforms, ensuring that virtual environments are accessible and reliable [b-version].

8.8 Web 3.0

Web 3.0 is the next iteration of the Internet, combining decentralized finance, non-fungible tokens (NFTs), decentralized governance, decentralized cloud services, and self-sovereign identity. With Web 3.0, travellers can access virtual experiences, decentralized and personalized reviews, and unique digital assets linked to travel experiences. The metaverse will facilitate decentralized booking platforms, smart contracts, decentralized payment systems, decentralized social media, decentralized tourist information platforms, and tokenization of tourism assets. Brands can create a virtual world that consumers can visit and explore, creating brand experiences, building customer loyalty, and testing new products before release.

The emergence of community-owned economies and social tokens in the metaverse will connect digital communities and reward them with tokens. In a Community Token Economy, communities can be global and will be able to exchange network tokens for contributions to the ecosystem. The metaverse can solve issues such as uncertainty, trustworthiness, reliability of reviews, and long waiting times, by offering virtual previews of destinations, activities and accommodations. Travelling can preview and select their accommodation, try out activities virtually, and offer on-the-spot reviews and ratings. User-generated content (UGC) stored in the metaverse can be captured as NFTs, which is accessible at any time. In the metaverse, a new form of word-of-mouth communication can emerge, meta-word-of-mouth (m-WoM), which allows tourists to share NFTs that encapsulate their memorable moments with future visitors. The metaverse can remove intermediaries and allow providers and consumers to directly interact, with smart contracts playing the role of the mutually trusted authority.

9 Metaverse tourism architecture

In a recent study [b-Go] proposed a ‘four-layer architecture of metaverse tourism’ approach that would also serve to minimize the impact of external factors. This four-layered approach shows the interconnection between metaverse tourism, the metaverse environment and the tourist by highlighting certain key features of metaverse tourism, namely:

- Licensed metaverse tourism products, experiences or metaverse tour sessions by sustainable tourism official organizations
- Infrastructures for metaverse tourism experiences
- Interconnectivity with physical products
- Easy accessibility with metaverse ecosystem
- Reproductivity of metaverse tourism experience as a souvenir

It should be noted that the key features highlighted above run the gamut in the metaverse tourism experience, and implementation in certain areas has already progressed to levels capable of attracting and capturing Gen Z (1997–2012) and Alpha (2010–2024) users, as well as other generations. The business opportunities in terms of the technology required to enhance a user's tourist experience in the metaverse is constantly evolving, with impressive developments in compatible gear such as VR headsets, AR data glasses and MR (Mixed Reality) headsets that all work with smartphones, tablets and computers. Furthermore, increasing inclusion by businesses of "in tandem" virtual experiences in real-life events like the Coachella Music Festival can arguably be quite helpful in making greater inroads into the consciousness of users of the acceptability of metaverse tourism as a viable alternative. This option can be exercised two-fold, namely as a forerunner to whet the travel experience appetite of the end user, until these said users have the financial wherewithal or travel confidence to make such a trip in real life. Or in the alternative, as a standalone option for the more vulnerable aging population and other high-risk groups.

10 Metaverse opportunities for the tourism industry

10.1 Empowering travel and tourism with the metaverse

Recent studies have identified many ways in which the metaverse can benefit tourism [b-Stelios]. These advantages can be categorized into three distinct areas: direct benefits to tourists; demand-side enhancements for tourists and destinations; and supply-side improvements for destinations. These benefits range from the personalization of travel experiences to the economic and governance aspects of tourism management.

10.1.1 Demand side benefits for tourists

- Personalized Destination Selection: Tourists can leverage the metaverse to choose vacation spots that align with their preferences.
- Streamlined Booking Processes: Accommodation and attractions can be booked seamlessly within the virtual environment.
- Customized Activity Planning: Tourists can tailor their itineraries with activities that resonate with their interests.
- Efficient Check-In/Out Procedures: Airports and hotels can utilize the metaverse for smoother check-in and check-out experiences.
- Anonymity in Interactions: Tourists can maintain privacy while engaging with service providers.
- Enhanced Experience Perception: The metaverse can enrich how tourists perceive and enjoy their travels.
- Memory Recollection: It offers a unique way to recall and relive travel memories.
- Evolution of Word-of-Mouth: Traditional word-of-mouth is augmented by meta-word-of-mouth within the metaverse.

10.1.2 Supply side benefits for tourism destinations

- Marketing Innovations: Destinations can tap into the metaverse as a novel marketing channel.
- Increased Brand Engagement: It provides opportunities for deeper and more interactive brand connections.

10.1.3 Combined demand and supply side benefits

- Disintermediation: The metaverse facilitates direct interactions, eliminating middlemen.

- Authentic Virtual Interactions: It enables remote yet personal encounters between tourists and providers.
- Trustworthy Reviews and Ratings: Online feedback becomes more reliable within the metaverse framework.
- Community Development: There is potential for building stronger, more engaged communities.
- Cryptocurrency Integration: The adoption of blockchain can foster a robust economy within the tourism sector.
- New Revenue Streams: It opens up additional income sources for destinations.
- Trust and Confidence: All parties involved can benefit from increased trust and security.
- Overbooking Prevention: The metaverse can help manage bookings more effectively.
- Enhanced Governance: Destinations can implement better governance schemes through this technology.

10.2 Building and augmenting destinations

Significant benefits will come from the emergence of the metaverse [b-white]. Digital communities will connect and form networks or cooperatives. They can be rewarded or paid with tokens. Users are no longer passive service consumers; they are stakeholders. In a Community Token Economy, communities can be global and will be able to exchange network tokens for contributions to the ecosystem. Social tokens will be essential to developing two-way relationships between travel companies and consumers [b-shumba]. The brand community can receive discounts, incentives and upfront experiences with their brands, and the tokens will allow the community to connect and feel like part of the community.

The metaverse has the potential to build and augment communities through its digital twin technology, which empowers destination awareness and coordination. By virtually visiting and engaging with destinations, consumers can experience the culture and attractions of a place, motivating them to plan authentic, responsible and sustainable travel experiences. Additionally, the use of avatars as virtual salespeople, influencers or brand ambassadors presents opportunities for businesses to connect with audiences and build relationships with communities in new and innovative ways.

Another significant role of the metaverse tourism is the cultivation of strong bonds between users and destinations or users of a particular brand with each other, resulting in communities building. Users, represented through avatars, enjoy spending time in their favourite places alongside like-minded people, engaging in conversations on shared interests.

User-generated content is a great way for tourists to remain connected after a trip. The metaverse supports users in engaging with places they have already been, sharing User Generated Content in immersive platforms, and staying in contact with people they have met, motivating repeat visits and loyalty. Decentralized tourist information platforms can provide more accurate and up-to-date information. Tourists can access information about local attractions, accommodation and events without relying on centralized platforms. This reduces the influence of advertising and empowers tourists to have a more authentic and localized experience.

The metaverse allows anyone to create gated gardens and rally people around via distributed governance and new incentive structures. These are “decentralized communities”: gated gardens for people to seek out other like-minded people who share their interests and obtain more profound and

intimate connections. Influencers who succeed will be able to cultivate deep relationships, foster trust within their networks, and provide utility to their followers.

10.3 Avatars and synthetic travel

The concept of synthetic travel is not new, and with the advent of the metaverse, this way of "virtually traveling" will certainly be accentuated. Interaction with other avatars makes the synthetic tourism experience particularly engaging.

The use of avatars in the metaverse has the potential to change how tourists interact with each other and tourism provider [b-Dwivedi]. With avatar-to-avatar communication, tourists can engage and communicate with hotel staff directly, in order to address any issues or make requests. The reliability of online reviews and ratings is a significant factor in tourists' decision-making process when selecting hotels, experiences or destinations. However, there are always concerns related to fake reputation, introducing an element of risk when individuals purchase a service. The metaverse offers a solution to this problem by allowing tourists to experience everything first hand, eliminating their dependence on reviews, ratings and word of mouth to the extent that it happens today. Furthermore, the use of blockchain technology, particularly through the implementation of smart contracts, ensures the accuracy and validity of each review published.

10.4 A new marketing opportunity

The metaverse will be another platform to attract customers to tourism and hospitality offerings, presenting an interactive and engaging space to offer customers valuable information that cannot be accurately provided in other ways [b-ESI]. This is an opportunity to engage with their target audience and convey their message. The metaverse can be proved to be immensely influential for destination managers and firms in all stages of a tourist's decision-making journey, as well as in managing their satisfaction and loyalty towards the brand [b-Dwivedi].

Brand engagement is of great importance for tourism companies and destinations as it revitalizes people's enthusiasm for the brand and adds to customer experience and brand loyalty. Destination managers will have the capability to utilize the metaverse organizing meta-events, incorporating gamification elements, offering rewards in the form of tokens for repeated visitors, and airdropping customized avatar accessories in the form of NFTs for their target audience [b-Dwivedi].

The tourism industry has traditionally relied on centralized platforms for things like reviews and bookings. The metaverse can disrupt this model by providing more decentralized and personalized options. Hospitality typically uses third parties; for example Expedia, HubSpot, Zoho and Trustpilot, to manage user information, and the third party can delete or restore valuable customer feedback. Third parties also carry out transactions, which lead to costly fees, and customers may experience delayed payments or fraudulent transactions. An intermediary always owns and controls things; for example, the whole organization's website functions on someone else's hosting platform.

The metaverse can allow for decentralized and personalized reviews not controlled by centralized platforms such as TripAdvisor, Yelp or Google Reviews. Decentralized reviews increase trust in users as they are less prone to manipulation and censorship than centralized ones, whereas personalized reviews allow for a more customized experience. This means that service providers can tailor their services to the needs and requirements of individual customers. With decentralized social media such as Facebook, Instagram or X, users have more control over their data, which, in turn, means more privacy and security. This allows tourists to have authentic and localized interactions.

Travel brands can use the metaverse to offer gated content, products or experiences accessible to those with certain NFTs and build and augment communities by incentivizing users through co-creation and ownership. Brands can monetize the brand by releasing limited digital collections and empower destination awareness, positioning and branding, coordination and management through digital twins. It also provides opportunities to support trip planning, interaction and engagement, effectively transforming consumer behaviour. Visiting and engaging with destinations is expected to motivate authentic travel rather than replace it.

The metaverse also can empower the tourism industry by tokenizing assets such as hotels, restaurants and attractions. Tokenization allows fractional ownership, increasing liquidity and reducing service providers' costs. It also allows tourists to participate in the ownership of tourism assets, increasing engagement and loyalty.

10.5 Enhancing the customer journey/experience

Metaverse tourism stands to significantly enhance the customer journey and experience within the tourism industry. By providing a virtual representation of hotels, destinations and services, customers can make more informed decisions about their travel plans. For instance, potential guests can take a virtual tour of a hotel, examining room sizes, amenities and the overall ambiance, which can greatly influence their booking decisions. This virtual preview ensures that customers' expectations align with reality, potentially increasing satisfaction and reducing the likelihood of post-purchase dissonance.

Moreover, the metaverse allows for an advanced exploration of destinations. Customers can virtually visit a city or a natural reserve, experiencing the sights and sounds, which can help them decide whether the destination meets their desires and needs. This immersive preview can also aid in itinerary planning, as customers can identify points of interest they wish to visit in person.

The metaverse also introduces a novel way to meet and interact with tour guides before the actual trip. By engaging with a guide's avatar, customers can establish a rapport, discuss tour options, and address any concerns, which can enhance the sense of personalization and security.

Additionally, cultural experiences such as museum visits can be expanded through metaverse tourism. Users can virtually walk through museum galleries, interact with exhibits, and even access exclusive content, all from the comfort of their homes; however, this is not likely to reduce the interest in accessing – if and when possible – the original items on display.

10.6 Virtual tourism to restricted or inaccessible locations

Metaverse tourism will open opportunities to visit historical sites that have been recreated virtually, access restricted locations that are closed to the public and visit locations of vulnerable communities. As a result, this can enhance accessibility to a variety of locations to those interested in visiting them in the physical world but are unable to.

For instance, delicate ecosystems or sacred indigenous lands that require protection from physical tourist footfall can be virtually modelled in the metaverse, providing an educational and immersive experience while safeguarding the actual location. Similarly, historical sites at risk of erosion or damage from over-tourism can be preserved digitally, allowing for continued public engagement and study without further endangering the physical site. This approach, however, raises ethical and legal questions. It is imperative to consider who is responsible for creating these virtual models and who stands to profit from them. Furthermore, ensuring the accuracy of these metaverse duplicates is crucial.

There must be mechanisms to verify that inaccessible locations are being faithfully and respectfully represented in virtual tourism experiences. Addressing these issues is essential to prevent the misrepresentation and exploitation of cultural and natural heritage.

Moreover, the metaverse can give access to knowledge and culture. People from all over the world, regardless of mobility or economic constraints, can virtually visit and interact with locations that would otherwise be out of reach. This broadens the horizons of individuals but also fosters a greater understanding and appreciation for global heritage and diversity.

In addition, the metaverse can serve as a tool for conservation and education. By offering virtual tours of restricted areas, it can raise awareness about the importance of these locations and the need for their protection. It can also provide a platform for scientific research and collaboration, allowing experts to study and discuss these areas without the need for physical travel.

10.7 Improved information and loyalty

In the realm of tourism, the metaverse offers innovative solutions for booking, information and loyalty. NFT-based bookings and travel packages provide secure and efficient travel arrangements, boasting transparent ownership and the potential for resale. Tourists can indulge in virtual tours and immersive experiences through metaverse travel destinations, allowing for extensive pre-trip explorations. The rise of decentralized hospitality marketplaces enables peer-to-peer accommodation rentals, activity bookings, and the discovery of local services. Additionally, gamified loyalty programmes enhance engagement by offering NFT-based rewards, fostering community governance, and providing interactive experiences.

10.8 Hospitality optimization with digital twins

The concept of digital twins in hospitality further revolutionizes the industry. Virtual replicas of destinations augment pre-trip research, accessibility and planning [b-Wang]. Real-time data optimization leverages dynamic pricing, resource management and personalized guest services. Sustainable tourism planning benefits from data-driven insights that minimize environmental impact and endorse responsible travel. Moreover, digital twins facilitate sustainable tourism management by monitoring environmental impact, optimizing resource allocation, and promoting sustainable practices. Lastly, the predictive maintenance of infrastructure, powered by real-time data, ensures the seamless operation of tourist facilities, thereby reducing downtime and enhancing the visitor experience.

10.9 Inclusion and the metaverse tourism

Metaverse tourism offers significant benefits for inclusion, accessibility, and bridging the digital divide [b-UNDP]. By creating virtual spaces that replicate real-world destinations, the metaverse allows individuals who may face physical, financial or social barriers to travel to experience the wonders of the world in an immersive and interactive manner. This democratization of travel experiences ensures that more people have the opportunity to explore and learn about different cultures and locations without the constraints of physical travel. However, this should accompanied by sustainable new business models, in order to ensure that such democratization of access does not correspond to a reduction of the benefit for the local communities.

In terms of accessibility, the metaverse can be designed with inclusivity at its core, providing features that accommodate users with disabilities. For example, virtual environments can be tailored to include audio descriptions for the visually impaired, sign language for the hearing impaired, and customizable avatars that represent a wide range of physical abilities. This level of customization and adaptability

makes the metaverse a space where everyone can participate equally, fostering a sense of belonging and community [b-WEF].

10.10 Addressing over-tourism with the metaverse

Over-tourism is a situation where a popular tourist destination experiences an influx of visitors that exceeds its capacity to cope and to ensure sustainable and culturally meaningful development. This can lead to a number of negative consequences, for the locals and for the tourists themselves. Here are some key characteristics of over-tourism:

1. **Too many tourists:** This is the most obvious sign, but the exact number that tips a destination into over-tourism varies depending on its infrastructure, carrying capacity, and the resilience of its environment and culture.
2. **Negative impacts on local residents:** Over-tourism can drive up the cost of living, making it difficult for locals to afford housing and basic necessities. It can also lead to overcrowding in public spaces, noise pollution, and put a strain on local resources like water and sanitation.
3. **Negative impacts on the environment:** Over-tourism can damage natural ecosystems, pollute air and water, and increase waste. In some cases, it can even threaten endangered species.
4. **Negative impacts on the tourist experience:** When there are too many tourists, it can be difficult to enjoy the sights and attractions of a destination. Crowds can make it hard to move around, queues can be long, and the overall experience can feel rushed and impersonal.

Over-tourism is often portrayed as a problem solely caused by tourists, neglecting the role of tourism companies, marketing campaigns, social media and inadequate infrastructure. This can lead to misguided solutions that target tourists unfairly. Meanwhile, accurately measuring the impact of over-tourism and understanding tourist behaviour is crucial for designing effective solutions. However, data collection and analysis can be expensive and time-consuming. It is such a multifaceted issue that requires collaboration between different stakeholders, including local communities, tourism authorities, businesses, social media groups and conservation groups. Fragmented decision-making processes can hinder progress. Currently there is still a lot of room to improve existing solutions to over-tourism.

The metaverse, with its immersive virtual worlds and digital avatars, offers possibilities for addressing over-tourism in the real world. Here are some potential ways it can be utilized:

- **Virtual tourism experiences:** Go beyond physical limitations in the metaverse. Imagine soaring over ancient ruins or diving into coral reefs without restrictions. This can enhance the tourist experience while protecting fragile ecosystems.
- **Simulate the impacts of over-tourism:** Show the consequences of mass tourism on virtual environments, showcasing issues like pollution, erosion, price inflation, and cultural dilution. This can raise awareness and encourage more responsible travel behaviour.
- **Manage tourist flows:** Use metaverse simulations to predict and manage tourist flows in real-world destinations and offer virtual experiences with dynamic pricing based on real-time visitor density in actual locations. This can encourage tourists to visit during less crowded times and spread- out visitation periods.
- **Propose alternative solutions:** The metaverse can provide real-time alternative booking solutions and destinations by providing “smart” matching of supply with demand for tourism preferences in real time and with visually assisted user feedback.

- **Manage impact on local tourism**: Balance the impact of over-tourism on the local environment while ensuring new income streams and business models can be identified to support a prosperous tourism industry to create new jobs for the local people.
- **Fostering tactical collaboration and innovation:** Use the metaverse as a sandbox to test and refine new tourism policies and strategies, infrastructure projects and sustainable practices before implementing them in the real world.

10.11 Hospitality and metaverse tourism

The Hospitality 3.0 outlines a transformative approach that integrates metaverse with hospitality to foster community, belonging and growth while addressing ecological, mental health and cultural challenges stemming from rapid technological adoption. It traces the evolution of hospitality, showcasing how technology has influenced cultural exchanges and blurred the distinction between local authenticity and global homogeneity. By merging ancestral knowledge with modern technologies and embracing a fluid and adaptive mind-set, Hospitality 3.0 aims to cultivate meaningful connections, encourage personal growth, and drive positive change across various sectors including travel, entertainment, education, wellness, workplace dynamics and retail experiences. This transformation emphasises cultural immersion, community building, sustainability, inclusivity and meaningful connections in physical and virtual environments, marking a new era of hospitality-driven interactions and engagement through a redefined guest-host continuum.

Out of the many global crises that are being faced the metaverse can support with the following three:

- Ecological crisis: Over the last decades, mass tourism has destroyed ecologies, promoted large-scale infrastructure development, mass production, mass consumption, waste, and devastation of natural sites and historical heritage landmarks. A new kind of planetary hospitality is becoming necessary to re-establish a healthy guest-host relationship with this Earth.
- Mental health crisis: Inhospitable virtual and physical environments contribute to a global mental health crisis. With so many platforms and services vying to make our lives more convenient, can cause a disconnected from the world.
- Cultural crisis: In physical environments and across digital platforms, cultural diversity is in crisis, with the emergence of an inhospitable monoculture shaped by the standardising forces of global capital. Multinational brands, in the mass market and in luxury markets, are increasing their global footprint, opening flagship locations which challenge local businesses and craftsmanship with the promises of the latest global trends.

Hospitality 3.0 is a dynamic tool and strategic guide shaped through collaboration with tourism communities, businesses, industry leaders and governmental agencies. Designed to address ecological, societal and cultural challenges, it promotes sustainable, inclusive, and innovative hospitality practices.

11 Examples of metaverse tourism applications

The metaverse is rapidly transforming the tourism industry by offering immersive experiences. Examples of metaverse tourism applications are diverse and innovative, ranging from virtual tours of historical sites to digital twins of luxury hotels. For instance, Millennium Hotels made a pioneering move by launching the first hotel in the metaverse, providing guests with a unique way to experience their services before even setting foot on the property. Museums and cultural institutions are not far behind, offering virtual tours that allow visitors to interact with exhibits from anywhere in the world. These examples not only illustrate the potential of the metaverse to enhance the tourism experience but

also highlight the technology's ability to make travel more inclusive and accessible to all. Additionally, it is important to recognize that some of these use cases are specific to certain types of operators such as airlines, while others are horizontal such as training. This distinction is crucial for understanding which use cases are scalable across industries and which ones will require industry-specific investments and knowledge. The diagram below outlines in summary how metaverse tourism could benefit these areas:

- Hospitality:
    - Enhanced customer engagement through virtual hotel tours and immersive experiences.
    - Increased brand exposure and awareness through virtual presence in the metaverse.
    - Improved customer satisfaction by offering pre-travel experiences.
- Travel Agents:
    - Expanded reach and accessibility by providing virtual travel consultations and itinerary planning.
    - Differentiation through innovative offerings such as virtual travel packages and destination experiences.
    - Streamlined operations and reduced costs through virtual customer interactions and bookings.
- Heritage Sites:
    - Preservation and digital documentation of cultural heritage through virtual tours and digital reconstructions.
    - Increased global visibility and accessibility, attracting visitors from around the world to experience heritage sites remotely.
    - Revenue generation through virtual ticketing and merchandise sales.
- Museums:
    - Enhanced visitor engagement and education through immersive virtual exhibits and interactive experiences.
    - Extended reach and accessibility to a global audience, without the limitation of geographical barriers.
    - Opportunity for monetization through virtual ticketing, memberships and digital merchandise sales.
- Entertainment and Leisure Operators:
    - Creation of immersive virtual entertainment experiences such as concerts, theme parks and gaming environments.
    - An expanded audience reach, attracting participants globally.
    - New revenue streams through virtual event ticketing, merchandise sales and sponsorships.
- Transportation Operators/Airlines:
    - Enhanced customer experience through virtual flight previews, airport tours and destination experiences.
    - Increased brand engagement and loyalty by providing innovative virtual travel services.
    - Streamlined operations and reduced costs through virtual customer service and booking platforms.
- Government Tourism Planning Authorities:
    - Data-driven insights and analytics for informed decision-making in tourism development and marketing strategies.

- Promotion of destinations through immersive virtual experiences, attracting potential visitors.
- Collaboration with industry stakeholders to ensure sustainable and inclusive growth in the tourism sector.

11.1 Shanghai metaverse tourism project

Shanghai is positioning itself strategically to establish the integration of Web 3.0 technologies within the tourism sector, targeting an annual revenue generation of USD 6.9 billion [b-Haq]. The initiative encompasses the deployment of a comprehensive Web 3.0 tourism ecosystem, utilizing blockchain protocols, AI algorithms, VR environments and other emergent tech to deliver immersive and decentralized travel experiences. Collaboration is being sought with prominent blockchain firms, technology providers and industry stakeholders to facilitate the development and execution of innovative Web 3.0 tourism projects.

These projects are aimed at the digitization of cultural heritage, the establishment of blockchain-based loyalty systems, and the enhancement of travel service transparency and security. Shanghai's Web 3.0 tourism blueprint is also designed to align with sustainable tourism objectives while preserving the city's extensive cultural legacy. In pursuit of these ambitions, approximately 36 metaverse-centric projects are slated for launch within a biennial timeframe, contributing to China's overarching initiative to attract a demographic of technologically adept travelling through customized and interactive travel experiences.

11.2 Ethiopian Airlines and the metaverse tourism

The integration of metaverse technologies in the airline industry is set to impact tourism significantly by offering immersive pre-travel experiences. Passengers can explore destinations and aircraft interiors virtually and select seats, thus enhancing their travel planning process. Additionally, the metaverse facilitates efficient training for airline staff through realistic simulations, ensuring a high level of service and safety. This technological leap forward promises to attract tech-savvy travelling and provide a seamless bridge between virtual exploration and physical travel [b-Brito].

Ethiopian Airlines is actively exploring the metaverse's potential to revolutionize the aviation industry by enhancing operational efficiency and customer experience. The airline may utilize 3D modelling for aircraft and airport simulations to improve design and functionality, while also employing virtual reality for comprehensive staff training. Additionally, Ethiopian Airlines could offer passengers virtual previews of flights and airports, enriching the travel planning process and potentially increasing customer satisfaction and loyalty. As the metaverse technology matures, Ethiopian Airlines' integration of these innovations could establish it as an industry leader in providing cutting-edge service and engagement [b-UST].

According to SITA, an IT provider in the aviation sector, by the year 2030, the incorporation of metaverse operations is projected to be a standard practice at foremost airports [b-Sita]. This integration is anticipated to significantly contribute to the optimization of airport processes, the mitigation of operational disruptions, and the facilitation of intuitive management of intelligent airport systems.

11.3 Louvre Museums in the metaverse

Museums are beginning to embrace the metaverse to extend their reach beyond physical boundaries, allowing visitors from around the world to explore exhibits and interact with artefacts in a virtual

space. Companies are developing virtual tours that enable users to navigate museum spaces as if they were there in person, engaging with the environment in a more immersive way than traditional online pictures or videos could offer [b-West].

One notable example is the Louvre Museum, which has ventured into the metaverse with its "Mona Lisa: Beyond the Glass" virtual reality experience. This project allows visitors to engage with the world-famous painting in a personal and intimate setting, free from the constraints of physical crowds and barriers [b-Louvre]. The experience is designed to be educational and interactive, using the latest scientific research to bring the artwork and its history to life.

The metaverse also presents opportunities for museums to digitize and preserve cultural heritage. Virtual reality can serve as a powerful tool for conservation, enabling museums to create digital archives of artefacts that are at risk of deterioration or are too fragile to be displayed. This not only safeguards the artefacts but also ensures that they remain accessible to future generations [b-Lopez].

Moreover, the metaverse can enhance educational programmes by providing immersive learning experiences. Students and enthusiasts can step virtually into historical events, walk through ancient civilizations and interact with historical figures, so making learning more engaging and impactful [b-Lopez].

As the metaverse continues to evolve, it is likely to become an integral part of the museum experience, offering a blend of education, preservation and entertainment. This digital transformation has the potential to democratize access to culture and knowledge, making it available to anyone with an Internet connection, regardless of their physical location.

11.4 Millennium Hotels in the metaverse

Hotels are venturing into the metaverse to transform the hospitality experience, and Millennium Hotels has pioneered this journey by launching the first-ever hotel in the metaverse, M Social Decentraland1. This innovative move allows customers to engage with the hotel's virtual counterpart, offering a unique blend of online interaction and offline engagement. Guests can socialize in virtual reality, interact with avatars, and even participate in prize draws for real-world hotel experiences [b-Hanson].

The metaverse provides hotels with a platform to showcase their properties in a new light, offering virtual tours that can enhance the booking process and marketing strategies. It allows potential guests to explore the hotel's amenities, room sizes and services in a virtual environment before making a reservation. This can lead to increased customer satisfaction as guests have a better understanding of what to expect during their stay.

Moreover, the metaverse can serve as a digital twin of the physical hotel, enabling the property to operate in both worlds simultaneously. This dual presence can be leveraged for upselling, hosting digital events and creating immersive brand experiences that extend beyond the physical location [b-metaman]. For instance, hotels can host virtual celebrations for guests who are unable to travel, providing a sense of inclusion and community despite physical distances.

11.5 Development of projects in the Middle East and North African Region

In the Middle East and North Africa region, for example, many previously underdeveloped natural and cultural heritage sites have recently become subjects of great interest. Such sites, which include islands across the Red Sea, as well as historical sites within the Arabian Peninsula, require the development, in some cases from scratch, of the needed infrastructure to host tourists. Additionally, infrastructure

projects such as new airports are in development. All new infrastructure projects can be built virtually first, in order to reduce cost and include sustainability considerations that may ultimately assist developers in real-world construction and even operation of these sites.

11.6 KLM Training and operations with metaverse tourism

The metaverse can be used to improve operations within a tourism, travel and hospitality organization, and offers training opportunities to the tourism workforce. One example includes KLM, which began offering their cleaning crew virtual fleet tours on an iPad using a VR headset to familiarize them with each cabin to improve its aircraft turnaround time. Opting for immersive 360° images instead of the standard 2D rendering on a sheet of paper increased overall efficiency, allowing staff to finish cleaning 15 minutes ahead of schedule and free of errors. After a successful test run, the airline now uses this technology for all cabin crew and caterers [b-Accenture].

11.7 Prayer Flag Project and metaverse tourism

The Prayer Flag Project is an innovative initiative that leverages the metaverse to enhance tourism and cultural exchange. Spearheaded by The META Foundation in collaboration with VAST Bhutan and the Rubin Museum of Art, the project has created a collection of 1080 unique NFTs [b-META]. These digital artefacts carry the traditional good wishes and positive messages characteristic of Bhutanese prayer flags, which are deeply rooted in the Buddhist philosophy of promoting peace, compassion, strength and wisdom [b-META].

By translating these prayer flags into the digital realm, the project opens up new avenues for virtual tourism. Enthusiasts from around the world can explore the virtual representation of Bhutan's rich cultural heritage, interact with the exhibits, and even contribute to the local economy and environmental efforts. The sales from these NFTs support educational programmes and aid in cleaning the mountains of Bhutan, blending tourism with philanthropy [b-META].

12 Challenges

Metaverse tourism, combining real and digital spaces, holds significant potential for the tourism sector. The metaverse can enable immersive experiences and reshape traditional tourism models. While promising, these changes like virtual travel and enhanced on-site experiences cause considerable challenges such as interoperability, sustainability and security issues.

12.1 Interoperability

One of the primary technical challenges is interoperability, which refers to the ability of different metaverse platforms to work together seamlessly. As the metaverse is not a single entity but a collection of various virtual environments and systems, ensuring that these can interact and exchange data without friction is crucial for providing a cohesive user experience [b-McKin2].

However, achieving interoperability is a complex challenge due to the diversity of platforms, each with its unique set of technologies, standards, and governance models. Metaverse tourism comprises an array of virtual environments built by different entities, and without interoperability, these environments risk becoming isolated silos, limiting the user experience and the potential for innovation. International standards play a pivotal role in overcoming these challenges. ITU's Focus Group on metaverse has published a vital report *Service scenarios and high-level requirements for metaverse cross-platform interoperability* exploring the intersection between the metaverse and interoperability [FGMV-19]. They provide a common framework for different metaverse platforms to align their technologies, ensuring compatibility and enabling data to be shared and used across different

systems. Just as international standards have facilitated global communication and commerce in the physical world, they can do the same for the metaverse for tourism, fostering an open and inclusive virtual space that is accessible to all. Furthermore, collaboration with national internet ecosystems, including digital ID systems and payment platforms, will be important to ensure interoperability and enable efficient and mutually beneficial global tourism applications. These integrated systems can help streamline user authentication, secure transactions, and enhance the overall user experience in the metaverse.

12.2 Social Acceptance

Social acceptance is a significant challenge for the metaverse in tourism, as it requires a shift in perception from traditional physical travel to virtual experiences. The metaverse offers immersive environments that can simulate travel experiences, but the concept may not be readily embraced by all, particularly those who prioritize the sensory and emotional aspects of physical travel [b-MDPI].

The tourism industry must navigate this challenge by positioning the metaverse as an enhancement to, rather than a replacement for, traditional travel. This could involve blending virtual and physical experiences, where the metaverse serves as a complementary platform. For example, travelling could use the metaverse to preview destinations, plan itineraries, or even visit inaccessible locations virtually before or after their physical trips.

Moreover, the metaverse can offer experiences that are not possible in the real world such as historical recreations or fantasy environments. These unique offerings could attract users who are looking for novel experiences beyond what physical travel can provide. However, the industry must ensure that these virtual experiences are accessible, inclusive, and resonate with the values and expectations of a broad user base to foster social acceptance [b-MDPI].

Research is also needed to understand tourists' perceptions, attitudes, and willingness to pay for mediated experiences in the metaverse. This will help the industry to tailor virtual travel options that meet the desires of different market segments, thereby increasing social acceptance and participation in metaverse tourism [b-MDPI].

12.3 Environment Social and Governance

It should be noted at this juncture that this inevitable addition to the tourism landscape is not excluded from the impact of Environmental, Social and Governance (ESG) considerations, especially as it pertains to the metaverse, and should be addressed when delving into the use and application of metaverse tourism. There are significant concerns as to the environmental sustainability of the metaverse given the rather sizeable environmental footprint it has in the real world. In addition, there will be a need for good governance measures to be implemented to safeguard users when engaged in activities linked to metaverse tourism. Ideally a global regulatory framework that is supported by international standards should be developed to ensure a level playground for all stakeholders involved in metaverse tourism. With global standards in place, there is increased certainty and transparency that can only enhance the viability (and attractiveness) of metaverse tourism to developing countries in areas such as the Caribbean, and South American and African States that may not previously have considered investing more significantly in this niche.

The sustainability challenge for the metaverse in tourism is a critical issue that encompasses environmental, economic and social dimensions. The environmental aspect focuses on the significant energy consumption required to power the extensive data centres and network infrastructure essential

for the metaverse's operation. These facilities consume vast amounts of electricity, much of which is currently generated from non-renewable sources, leading to a considerable carbon footprint [b-McKin2]. To address this, it would be beneficial for industry to prioritize the development of energy-efficient technologies and the use of renewable energy sources to power these data centres. Additionally, the design of the metaverse platforms should incorporate sustainable practices such as optimizing data transmission to reduce energy usage [b-MDPI].

Economically, the metaverse must demonstrate its long-term viability without causing significant negative externalities. This includes considering the lifecycle of VR/AR hardware, promoting recycling and re-use, and ensuring that the economic benefits of metaverse tourism are distributed equitably [b-MDPI].

Socially, the metaverse should contribute positively to the communities it affects. This means creating inclusive experiences that are accessible to all, regardless of socio-economic status, and supporting initiatives that benefit society at large [b-MDPI].

Culturally, the metaverse has to ensure representations that are respectful of the actual cultural items, values and practices – avoiding stereotyping and over-simplifying. At the same time, offered experiences should not promote or facilitate conflicts or misunderstandings.

12.4 Personally identifiable information protection and security

Metaverse tourism introduces a variety of security issues that shall be addressed to ensure the safety and security of participants. Personally identifiable information (PII) protection and security in the metaverse are critical concerns, particularly in the context of tourism, where users' personal and financial information is often involved. As tourists navigate virtual environments, they leave behind digital footprints that could include sensitive data such as travel preferences, payment information and personal identifiers. Ensuring the confidentiality, integrity and availability of this data is paramount to maintaining user trust, confidence and the metaverse's reputation as a secure destination for virtual tourism [b-MDPI].

The challenge lies in the metaverse's inherent openness and interconnectedness, which, while facilitating immersive experiences, also increases the risk of data breaches and cyberattacks. Metaverse platforms must implement robust security measures, including encryption, authentication and decentralized identity system, data integrity, access controls and continuous monitoring, to safeguard user data. Moreover, as users may traverse multiple platforms within the metaverse, a unified approach to security across different environments is necessary to prevent vulnerabilities and ensure consistent protection [b-MDPI].

PII protection concerns also extend to the control users have over their data and how it is used. Clear and transparent privacy policies, along with user consent mechanisms, are essential to empower users and comply with global data protection regulations. Implementing privacy-enhancing technologies is crucial in the metaverse. The metaverse's operators must be proactive in addressing these issues, as outdated PII protection and cybersecurity regulations may not fully cover the nuances of virtual environments [b-WEF2].

12.5 Affordability

The affordability challenge of the metaverse in tourism is a significant barrier to its widespread adoption. The immersive nature of the metaverse requires advanced VR/AR hardware and substantial

bandwidth, both of which come at a high cost. This financial barrier can prevent many potential users from accessing the metaverse, thereby limiting its reach and impact within the tourism industry [b-McKin2].

Currently, the cost of high-quality VR/AR hardware is prohibitive for many, and the bandwidth required for a truly immersive experience can be costly, especially in regions with higher Internet prices or limited infrastructure [b-MDPI].

To address this challenge, efforts must be made to reduce the cost of entry into the metaverse. This could involve developing more cost-effective hardware, optimizing software to run on less powerful devices, and working with Internet service providers to offer affordable data plans that support metaverse activities. Moreover, there's a need for international collaboration to establish standards that could drive down costs through economies of scale. By agreeing on common protocols and technologies, the industry can streamline development and reduce redundancy, which in turn can lower prices for consumers [b-McKin2].

12.6 Accessibility and the digital divide

Accessibility in the metaverse is a multifaceted issue. The topic of accessibility and the metaverse is being explored in more detail through ITU-T FG-MV Working Group 8, particularly the deliverables on *Requirements of accessible products and services in the metaverse: Part I – System design perspective* and *Requirements of accessible products and services in the metaverse: Part II – User perspective*. The technology required to fully experience the metaverse such as VR headsets and high-speed Internet, is not universally available or affordable. This creates a barrier for individuals from lower socio-economic backgrounds or those living in regions with limited technological infrastructure.

Inclusion within the metaverse is equally critical. The metaverse has the potential to be a space where diversity is celebrated, and various cultures and identities can be represented. However, there is a risk that without deliberate efforts, the metaverse could replicate or even exacerbate the biases and inequalities present in the physical world.

The digital divide is one of the most pervasive challenge. It refers to the gap between those who have ready access to computers and the Internet, and those who do not. In the context of metaverse tourism, the digital divide could prevent a large segment of the global population from accessing these novel experiences. Bridging this divide requires not only technological solutions but also educational initiatives to equip individuals with the skills needed to navigate and benefit from the metaverse.

12.7 Jurisdiction and enforcement

One additional challenge in metaverse tourism is jurisdiction and enforcement. In traditional travel, tourists are subject to the laws of the country they visit, ensuring clarity and accountability. However, in the metaverse, this straightforward jurisdictional approach is disrupted. For instance, a tourist from one country exploring a virtual experience hosted by an entity in another country faces ambiguity about whether the laws of their home country or the host country apply, particularly regarding freedom of speech and expression. This legal uncertainty complicates the user experience and raises questions about which legal standards should govern behavior in virtual environments.

In the metaverse, the enforcement of rules may function more like the community guidelines or terms of service set by the hosting platform. This shift from national laws to platform-specific rules introduces variability in legal and ethical standards, posing a challenge for both users and developers.

The need to comply with diverse and potentially conflicting regulations can increase the complexity and cost of developing and maintaining virtual tourism experiences. This increased burden may discourage potential hosts from investing in metaverse tourism, thereby affecting the sector's growth and attractiveness. Addressing these jurisdictional challenges is crucial for creating a consistent and legally sound framework that supports the sustainable expansion of metaverse tourism.

13 Future Perspectives and Recommendations

13.1 The future of the metaverse in tourism and the Sustainable Development Goals

The future of the metaverse tourism is positioned to take significant traction, with forecasts suggesting it could become a USD 1 trillion market by 2030 [b-McKin2]. This growth is driven by an increasing demand for virtual experiences that offer new ways to explore and interact with the world. The metaverse promises to extend the global economy into virtual life, reshaping conventional travel and tourism.

In terms of achieving the Sustainable Development Goals (SDGs), the metaverse has the potential to make significant contributions. For instance, it can promote sustainable cities and communities (SDG 11) by providing virtual tourism experiences that reduce the need for physical travel, thereby lowering carbon emissions and preserving natural and cultural sites [b-Umar]. It can also contribute to quality education (SDG 4) by offering immersive learning experiences that transcend geographical barriers.

Moreover, metaverse tourism can foster industry innovation and infrastructure (SDG 9) by pushing the boundaries of technology and creating new economic opportunities within the tourism sector [b-McKin2]. It can also advance reduced inequalities (SDG 10) by making travel experiences more accessible to people who may not have the means or ability to travel physically.

13.2 Standardization implications and considerations

International standards are crucial for the metaverse, particularly in the context of tourism, as they provide a framework for consistency, interoperability and quality across different virtual platforms. These standards ensure that regardless of the metaverse environment tourists choose to visit, they can expect a certain level of experience, security and accessibility [b-McKin2].

For metaverse tourism, international standards can help in creating a seamless experience for travelling as they navigate between various virtual worlds. This is especially important for preserving the continuity of cultural experiences, historical accuracy and environmental representations in virtual tourism. Standards also play a key role in ensuring that the digital representations of destinations are respectful and accurate, thereby maintaining the integrity of the real-world locations they depict [b-Springer2].

Moreover, standards are essential for user safety and data protection within the metaverse. They help establish common protocols for privacy, which is paramount when dealing with the personal information of users who may be engaging in transactions or sharing sensitive data within these virtual spaces. This is particularly relevant for tourism, where payment information and personal identification are often required for bookings and reservations [b-Springer].

International standardization bodies should pursue developing standards for metaverse tourism to ensure a harmonized, secure and accessible global virtual environment. As the metaverse becomes an increasingly popular platform for tourism, consistent standards are essential for interoperability between different virtual spaces, ensuring that users have a seamless experience as they navigate

through various tourism offerings. These standards would also address PII protection, security and data protection, fostering trust among users. Moreover, they can guide sustainable practices and accessibility, making virtual tourism experiences inclusive and available to a wider audience. By setting these standards, international bodies can facilitate the growth of a metaverse tourism industry that is equitable and ethical, and enhances the global tourism experience.

14 Conclusion

Metaverse tourism offers many benefits to travel and tourism. These include the possibility for customers to virtual tour the hotel, cruise ship or destination. Tourists can visit hotel rooms, offerings, interiors and outside views and check their services without being physically present. This opens accessibility to travel for those with mental health problems, complex needs, social isolation and multiple long-term conditions.

Looking ahead, further analysis and research are crucial to fully understanding the implications and potential of the metaverse in tourism. Future studies should explore areas such as the scalability of metaverse applications, the long-term sustainability of decentralized systems and the impact of virtual experiences on consumer behaviour and destination marketing. Additionally, there is a pressing need for standardization efforts to address interoperability challenges and ensure seamless integration of metaverse technologies into existing tourism infrastructure. By continuing to explore these avenues, researchers can contribute to unlocking the full transformative power of the metaverse in the travel and tourism landscape, shaping the industry for decades to come.

Appendix I Metaverse Tourism Roadmap: Methodology

Phase 1: Foundations for Immersive Travel (short term)

- **Focus:** Building the core infrastructure and best practices for immersive travel experiences.
- **Action:**
  - **Collaborate with tourism boards and cultural institutions:** Establish partnerships to develop authentic and ethical virtual destinations, ensuring respectful representation of diverse cultures and communities.
  - **Develop design guidelines and standards:** Create best practices for crafting visually stunning, historically accurate and culturally sensitive virtual environments.
  - **Conduct usability testing and research:** Assess accessibility features and identify areas for improvement, ensuring that metaverse travel caters to diverse needs and abilities.
  - **Promote digital literacy and accessibility:** Partner with NGOs and educational institutions to bridge the digital divide and empower everyone to participate in metaverse tourism.
  - **Promote engagement:** Through sensitization advertisements.

Phase 2: Expanding Horizons and Engagement (medium term)

- **Focus:** Enriching experiences, fostering connections and exploring innovative use cases.
- **Action:**
  - **Integrate gamification and interactive elements:** Design engaging activities and challenges that motivate exploration, learning and cultural exchange in virtual destinations.
  - **Develop innovative partnerships and business models:** Collaborate with businesses, educational institutions and organizations to unlock new applications of metaverse travel such as virtual field trips, corporate training programmes and therapeutic experiences.
  - **Create a global forum for collaboration:** Establish a platform for knowledge sharing, best practice exchange and fostering cross-cultural partnerships between stakeholders in metaverse tourism.
  - **Promote responsible and sustainable development:** Advocate for ethical guidelines and standards to address data privacy, cultural appropriation and potential environmental impacts of metaverse tourism.

Phase 3: Beyond Borders: A Metaverse for All (long term)

- **Focus:** Democratizing travel, breaking down barriers and shaping a future where everyone can explore the world.
- **Action:**

Advance accessibility technologies: Research and develop cutting-edge solutions to make metaverse travel inclusive and accessible for all, regardless of physical limitations or technological disparities.

Promote global connectivity and cross-cultural understanding: Utilize metaverse platforms to bridge cultural divides, facilitate immersive cultural exchanges and foster empathy and understanding between diverse communities.

Address global challenges: Explore the potential of metaverse tourism to tackle global issues like poverty, inequality and environmental degradation, showcasing its role in creating a more just and sustainable future.

Continuously innovate and adapt: Embrace emerging technologies and stay at the forefront of metaverse development, ensuring the future of travel evolves to cater to the changing needs and aspirations of humanity.

Appendix II Metaverse Tourism Roadmap: Tailored Roadmap for Bangladesh

Phase 1: Foundations for Immersive Travel:

- **Collaborate with Bangladeshi tourism entities:** Partner with the Bangladesh Tourism Board, local museums, cultural institutions and tour operators to create authentic and engaging virtual experiences showcasing Bangladesh's rich history, vibrant culture and breath-taking landscapes.
- **Prioritize accessibility:** Focus on developing VR experiences that are compatible with affordable headsets and low-bandwidth connections, making metaverse travel accessible to a wider audience in Bangladesh.
- **Highlight local stories and perspectives:** Partner with local communities and indigenous groups to ensure their voices and narratives are represented in virtual destinations, promoting cultural understanding and respect.
- **Promote digital literacy and infrastructure:** Work with government agencies and NGOs to create educational programmes and awareness campaigns to bridge the digital divide and equip Bangladeshis with the skills to access and benefit from metaverse tourism.

Phase 2: Expanding Horizons and Engagement:

- **Integrate gamification inspired by Bangladeshi traditions:** Incorporate elements of local games and activities, like boat races on the Sundarbans or kabaddi tournaments, into virtual experiences to foster engagement and cultural learning.
- **Focus on sustainable tourism:** Develop virtual experiences that promote responsible travel practices, highlighting the importance of protecting Bangladesh's natural heritage and supporting local communities.
- **Showcase culinary delights:** Create interactive virtual food experiences that allow users to explore Bangladeshi cuisine, learn traditional recipes and connect with local chefs.
- **Embrace local arts and crafts:** Integrate virtual platforms for showcasing and selling Bangladeshi handicrafts, textiles and artwork, empowering artisans and promoting cultural exchange.

Phase 3: Beyond Borders: A metaverse for All Bangladeshi's people and all others:

- **Connect with the global metaverse community:** Build partnerships with international stakeholders to promote Bangladeshi tourism in the metaverse, attracting new visitors and driving economic growth.
- **Address rural-urban disparities:** Utilize metaverse technology to bridge the gap between rural and urban areas in Bangladesh, providing educational opportunities and improving access to services for disadvantaged communities.
- **Contribute to global sustainability goals:** Showcase Bangladesh's efforts in environmental conservation and climate change mitigation through virtual experiences, inspiring global action and collaboration.

- **Continuously innovate with local talent:** Foster a thriving Bangladesh-based metaverse development ecosystem, nurturing local talent and ensuring that Bangladeshi perspectives shape the future of this transformative technology.

Appendix III An example of how metaverse tourism could be developed and designed

This an example on how to design "*the pre-trip stage*" from the perspective of the customer and providers of tourist products, in a metaverse including the following subcategories:

1. (pre) experiences of *real locations;*
2. experiences in *virtual trips:*
    a. *designed for tourists who for economic reasons or mobility difficulties are unable to travel physically;*
    b. *to inaccessible locations;*
    c. *to (inexistent) created locations*.

Table III-1 Example activities in metaverse tourism

No	Title	Related subcategory
1)	Virtual trips: metaverse tour planning and purchasing platform	2.a.
2)	Perspectives of a "virtual" or "traditional trips – travel agency" in the metaverse	2
3)	"Experience tourist metaverse" of locations that do not exist. Xtm	2.b 2.c
4)	Some tools and technologies to ensure privacy and security	2
5)	Business model based on payment for access virtually to exclusive or inaccessible locations	2.b
6)	Virtual metaverse in collaboration with role models or idols to design unique virtual locations – co-creation unique locations	2.c
7)	Co – creation: contract between the referent virtual places / locations and the experience tourism metaverse (xtm)	2.c
8)	Co –creation design process together with the referent the desired virtual places / locations	2.a 2.b
9)	Planning a traditional trip	1
10)	Ethical, design and functional issues – pre – trip stage	1

Metaverse should be designed so that includes tourism activities from the perspective of tourists and also traditional tourism service providers, as well as other tourism-related services. On the other hand, it would be beneficial to design a "platform" that provides virtual trips.

Considering this "futuristic approach", topics like the following should be considered:

- *Immersive experiences for tourists*: Within the metaverse, tourists could experience detailed virtual destinations that recreate real-world locations and created-world locations. They could explore historic cities, nature reserves, or inaccessible locations, or even imaginary worlds created exclusively for the metaverse.
- *Interaction with traditional tourism services*: Hotels, restaurants, amusement parks and other service providers could have their own virtual representations within the metaverse. Tourists could book hotel rooms, order in virtual restaurants, buy tickets for attractions and shop in virtual shops.
- *Interaction in virtual touristic experiences in real or create locations.*
- *Personalisation and recommendations*: Using advanced recommendation algorithms, the metaverse could offer tourists personalized experiences based on their interests, preferences and past behaviour. This could include suggestions for destinations, activities, restaurants and accommodation.
- *Integration of transport and health services*: Transport services could be available within the metaverse, allowing tourists to move easily between different virtual destinations. In addition, virtual healthcare services could be available for emergencies or health consultations while travelling.
- *Collaboration between service providers*: Different tourism service providers could collaborate within the metaverse to offer integrated tourism packages. For example, a hotel could partner with a restaurant and a travel agency to offer a complete package including accommodation, food and activities.
- *Live events and entertainment*: The metaverse could host live events, concerts, theatre shows and other forms of real-time entertainment. Tourists could attend these events virtually, interacting with other participants and performers from around the world.
- *Security and privacy*: Robust security measures must be implemented to protect users' personal and financial information within the metaverse. It is also important to ensure users' privacy and provide options to control how much information they wish to share.
- *Sustainability*: Consider integrating sustainable practices within the metaverse such as promoting eco-friendly tourist destinations and raising awareness about environmental conservation.

1) Virtual trips: metaverse tour planning and purchasing platform

Designing a metaverse tour planning and purchasing platform for physically inaccessible destinations.

Here are some important design issues to consider to ensure an engaging and immersive experience:

Visual and Sensory Immersion:

- Use high-quality graphics and virtual reality technologies to create visually stunning representations of inaccessible destinations.
- Incorporate ambient sounds, music and sound effects to increase sensory immersion and make users feel as if they are actually at the destination.

Interactivity and Exploration:

- Allow users to freely explore destinations with their avatars, interacting with the environment and discovering places of interest.
- Integrate interactive elements such as games, challenges or activities related to local culture to keep users engaged.

Customisation and Flexibility:

- Offer personalisation options so that users can tailor their experience according to their individual interests and preferences.
- Allow users to create personalized itineraries and add specific activities according to their wishes.

Social Collaboration:

- Facilitate social interaction between users by enabling the creation of groups, real-time communication and the organisation of joint activities.
- Integrate social networking functions so that users can share their experiences, photos and videos with friends and family.

Universal Accessibility:

- Design the platform to be accessible to users of all ages and abilities, including those with physical or sensory disabilities.
- Provide customisable navigation options and controls to suit the individual needs of each user.

Security and Privacy:

- Implement robust security measures to protect users' personal and financial information, as well as to prevent harassment and inappropriate behaviour.
- Provide users with options to control their privacy and visibility of their profile and activities within the metaverse.

Monetisation and Transactions:

- Enable the purchase of tour packages, products and services within the metaverse using secure and reliable payment methods.
- Offer monetisation options for destination owners and service providers within the metaverse such as selling virtual products or advertising in the virtual environment.

Technical Support and Community:

- Provide technical support and customer service to assist users with technical issues or questions related to the platform.
- Foster an active and participatory community of users through discussion forums, online events and other engagement activities.

By considering these design issues, it is possible to create a platform for planning and purchasing travel packages in the metaverse that offers a unique and engaging experience for users, allowing them to explore and enjoy inaccessible destinations in a virtual and immersive way.

From a “virtual tourist” perspective, it is important to design an immersive and engaging experience that allows users to really feel as if they are exploring a real tourist destination. Here are some key issues to consider when designing the virtual tourist experience:

Exploration and Discovery:

- Provide a vast and detailed virtual environment that allows users to freely explore the tourist destination.
- Incorporate highlights and hidden points of interest so that users can discover new experiences and places as they explore.

Interaction with the Environment:

- Allow users to interact with the virtual environment in a variety of ways such as walking, running and swimming.
- Integrate interactive elements into the environment such as the ability to open doors, collect objects and interact with non-player characters.

Activities and Entertainment:

- Offer a variety of activities and entertainment within the virtual destination such as guided tours, excursions, sports, games and cultural events.
- Integrate mini-games and challenges related to the destination's culture and attractions to keep users interested.

Personalisation and Choice:

- Provide personalisation options so that users can tailor their experience according to their individual interests and preferences.
- Allow users to choose from a variety of activities and routes to create their own personalized itinerary within the virtual destination.

Sensory Immersion:

- Use realistic visual and sound effects to create an immersive experience that stimulates users' senses.
- Incorporate atmospheric effects such as weather changes, day-night cycles and ambient sounds to enhance the sense of reality.

Social Interaction:

- Facilitate social interaction between virtual tourists by enabling real-time communication, group formation and participation in joint activities.
- Integrate social networking features to allow users to share their experiences and connect with other virtual tourists within the destination.

Access to Tourist Information and Guidance:

- Provide access to detailed information about the attractions, history, culture, cuisine and other aspects of the virtual destination.
- Integrate virtual tour guides that offer commentary and additional details about attractions and events within the destination.

Monetisation and Rewards:

- Offer monetisation options for virtual destination owners such as the sale of virtual souvenirs, premium access to certain areas or exclusive experiences.
- Implement reward and achievement systems to incentivise participation and exploration within the virtual destination.

When designing the "virtual tourist" experience, an engaging, interactive and immersive environment should be created so that allows users to enjoy and explore the destination virtually with the same excitement and satisfaction as if they were there physically.

2) Perspectives of a "virtual" or "traditional trips – travel agency" in the metaverse

From the perspective of a "virtual or traditional trips - travel agency" in the metaverse, there are a number of important considerations and issues to take into account in order to provide a satisfactory and safe experience for users. Here is a detailed list of these aspects:

Payment Gateway:

- Implement a secure and reliable payment gateway that supports a variety of payment methods such as credit cards, bank transfers and cryptocurrencies.
- Ensure data encryption and compliance with security standards to protect users' financial information.

Prices and Fees:

- Clearly and transparently display prices of tour packages and additional services, including taxes, fees and additional charges.
- Inform users of any hidden fees or additional costs before confirming the booking.

Fraud Prevention:

- Implement advanced security measures to prevent fraud and protect users against identity theft and other cybercrime.
- Use identity verification and fraudulent behaviour detection systems to identify and prevent suspicious activity.

Travel Time and Tourist Experience:

- Provide a realistic estimate of the time required to complete the virtual travel experience, including the duration of activities and travel between destinations.

- Design the virtual tourist experience to be as seamless and engaging as possible, minimising loading times and optimising the performance of the metaverse.

Perspective and Points of Interest:

- Highlight the most relevant and popular points of interest of each tourist destination within the metaverse, providing detailed information and exploration options.
- Offer varied and panoramic perspectives of landmarks to allow users to get a complete and detailed view of destinations.

Destination Selection:

- Include a wide range of popular and exotic tourist destinations in the virtual travel agency offering, providing options for all tastes and preferences.
- Regularly update the selection of available destinations and experiences to maintain freshness and user interest.

Customer Support:

- Provide real-time customer support via live chat, e-mail or phone to help users with questions, technical issues or assistance during booking.
- Establish clear cancellation and refund policies and offer assistance options for those who need to modify or cancel their bookings.

Monetisation and Promotion:

- Explore additional monetisation opportunities through the sale of travel-related products such as virtual souvenirs, digital tour guides or premium experiences.
- Implement effective promotional strategies to attract new users and encourage loyalty from existing customers such as discounts, special offers and rewards programmes.

By considering these aspects from the perspective of a virtual trip – a travel agency in the metaverse – you will be able to offer a complete, secure and engaging travel planning and booking experience for your users.

3) "Experience tourist metaverse" of locations that do not exist. Xtm

Creating a virtual tourism sub-metaverse based on fictitious locations but customized for users using information generated by algorithms from photos, past experiences and places most visited by social network users.

Steps to implement this idea:

a. Data Collection:

- Use data analytics algorithms to collect information about users' preferences, interests and past activities within the virtual tourism metaverse.
- Analyse data from social networks, metaverse activity logs and other available data to identify patterns and trends in user behaviour.

b. User Profile Generation:

- Create user profiles based on the information collected, including details such as interests, travel preferences, past activities and destinations visited within the metaverse.
- Use machine learning algorithms to segment users into groups with similar characteristics and preferences.

c. Personalized Location Design:

- Use information collected about users to design personalized virtual locations that are tailored to their interests and preferences.
- Create virtual environments that reflect the activities, experiences and places users have enjoyed in the past, but in a fictional, personalized context.

d. Personalized Destination Suggestions:

- Use recommendation algorithms to suggest virtual locations to users that match their individual profiles and preferences.
- Offer personalized recommendations of fictional destinations that incorporate elements and features that appeal to each individual user.

e. Interaction and Feedback:

- Allow users to explore and experience personalized virtual locations within the tourism sub-metaverse.
- Collect feedback from users about their experience in these virtual locations and use it to improve and refine future recommendations.

f. Continuous Updating:

- Maintain updated user database and travel profiles to reflect changes in user preferences and behaviours over time.
- Incorporate new data and trends as they emerge to improve the accuracy and relevance of personalized destination suggestions.

By following these steps, you could create a unique and highly personalized virtual tourism sub-metaverse, offering users fictionalized travel experiences that are fully tailored to their individual interests and preferences. This could significantly improve user satisfaction and engagement within the virtual tourism meta-verse.

Some important ethical and legal issues you should consider:

a. Privacy of Personal Data:

- Ensure that the privacy of users' personal data is respected and that applicable data protection laws and regulations are complied with.
- Obtain explicit consent from users before collecting, storing or processing any personal data, including names, e-mail addresses and locations.

b. Confidentiality of Personal Information:

- Implement appropriate security measures to protect users' personal information against unauthorized access, leaks or security breaches.
- Limit access to personal information to only those employees or contractors who need to have it to fulfil their job responsibilities.

c. Transparency and User Control:

- Provide users with clear and understandable information about how their personal data are collected, used and shared within the tourism metaverse.
- Allow users to control and manage their privacy preferences, including the option to opt out of certain features or services that involve the collection of personal data.

d. Informed Consent:

- Obtain informed consent from users before sharing their personal information with third parties or using it for marketing or advertising purposes.
- Provide users with the option to revoke their consent at any time and ensure that this process is clear and easy to understand.

e. Online Identity Protection:

- Implement measures to protect users' online identity such as the use of pseudonyms or avatars instead of real names in public areas of the metaverse.
- Avoid inadvertent publication or disclosure of personally identifiable information that could compromise the security or privacy of users.

f. Integrity of Social Relationships:

- Respect the privacy of users' social relationships and avoid sharing sensitive information about friends, family or other connections without their consent.
- Do not use users' social relationship data for commercial or advertising purposes without their explicit permission.

g. Legal and Regulatory Compliance:

- Comply with all applicable laws and regulations relating to data privacy, consumer protection and information security.
- Be aware of any changes in relevant legislation and adjust privacy and data protection practices as necessary to ensure ongoing compliance.

By proactively addressing these ethical and legal issues, it is possible to protect the privacy and rights of users within the virtual tourism metaverse, thereby building a trusting and secure relationship with your audience.

Ensuring the privacy of your virtual tour is a top priority. Here are some measures to ensure that personal data and travel experience are kept private and secure:

- **Transparent Privacy Policy:** Ensure that the virtual travel platform has a clear and transparent privacy policy that explains how your personal data are collected, used and protected during your travel experience.
- **Personal Data Control:** Provide users with control options over their personal data such as the ability to opt out of sharing certain types of information or adjust their privacy preferences as needed.
- **Data Encryption:** Uses robust encryption technologies to protect the security of personal data during transmission and storage on the virtual travel platform.
- **Secure Access:** Implements security measures to protect access to your virtual travel account such as strong passwords, two-factor authentication and suspicious activity monitoring.
- **Data Deletion:** Provide the option to permanently remove your personal data from the online travel platform when you no longer need it, in accordance with applicable privacy regulations.
- **Informed Consent**: Obtain informed consent from users before collecting, using or sharing their personal data for specific purposes related to your online travel experience.
- **Security Audits:** Conduct regular security audits to identify and address potential vulnerabilities in the virtual travel platform that could compromise the privacy of users' personal data.
- **Regulatory Compliance**: Ensure compliance with all applicable laws and regulations related to data privacy, consumer protection and information security in the context of your virtual travel experience.

By implementing these security and privacy measures, it is possible to instil confidence that personal data and virtual travel experience will remain private and secure as users explore the virtual world.

4) Some tools and technologies to ensure privacy and security

To ensure privacy and security in a virtual travel platform, you can consider a combination of tools and technologies. Here are some options you could use:

- **Blockchain**: Blockchain technology can be useful to ensure data integrity and transaction security. You can use blockchain to securely store user information and travel transactions, which helps prevent tampering or unauthorized access to data.
- **Data Encryption**: Uses data encryption tools to protect users' personal and financial information during transmission and storage. This ensures that only authorized parties can access the data.
- **Two-Factor Authentication (2FA):** Implements two-factor authentication to enhance the security of user accounts. This requires users to provide two forms of verification (such as a password and a code sent to their mobile phone) before accessing their account.
- **Decentralized Identity Management (DID**): Consider implementing decentralized identity management (DID) systems, which allow users to have full control over their own identity and personal data, thus reducing the risk of privacy breaches.
- **Role-Based Access Control (RBAC):** Uses role-based access control systems to ensure that only authorized users can access certain functions and data within the virtual travel platform.
- **Regular Security Audits:** Conducts regular security audits to identify potential vulnerabilities in the platform and take corrective action to mitigate any security risks.
- **Privacy Policies and Regulatory Compliance**: Ensure that you have clear and transparent privacy policies that comply with applicable data privacy laws and regulations in your jurisdiction. In addition, ensure that the platform complies with security and privacy standards set by relevant regulatory organisations.
- **Accessibility Capabilities**: To cater to older contractors and other groups with special needs, ensure that the platform is accessible to people with disabilities by providing accessibility options such as increasing text size, adjusting contrast and offering support for screen readers.

By integrating these tools and technologies into your virtual travel platform, you can strengthen the security and privacy of user data, as well as ensure appropriate access for older travellers and other groups with special needs.

5) Business model based on payment for access virtually to exclusive or inaccessible locations

Considering turning your **virtual tourism metaverse platform into a business model based on payment for access virtually to exclusive or inaccessible locations.**

This is an interesting strategy that can offer users a unique and premium experience.

Here are some considerations and steps to follow to implement this idea:

- **Exclusive and / or Premium Content**: Develop and offer exclusive and / or premium content within the metaverse that is only available to those who pay for access. This could include special virtual locations, unique experiences, premium activities and personalized services.
- **Subscription or Pay-Per-Use Model**: Decide whether you prefer to implement a subscription model, where users pay a periodic fee for ongoing access to exclusive content, or a pay-per-use model, where users pay only for the specific locations or experiences they wish to visit.
- **Secure Payment Gateway**: Implement a secure and reliable payment gateway that allows users to securely conduct financial transactions within the metaverse. Be sure to offer a variety of payment options to suit users' preferences.

- **Clearly Defined Value Offer**: Clearly communicate the value offer of your paid virtual tourism platform, highlighting the exclusive benefits and premium experiences that users can enjoy when paying for access.
- **Promotion and Marketing**: Promote your paid online tourism platform through effective marketing strategies, using channels such as social media, online advertising, influencer partnerships and content marketing to reach your target audience.
- **High Quality Customer Support**: Provide exceptional customer service for users of your paid online tourism platform, ensuring you respond quickly to queries, resolve issues efficiently and provide personalized assistance as needed.
- **Constant Updates and Upgrades**: Continue to improve and update your virtual paid tourism platform with new content, features and functionality to maintain user interest and satisfaction over the long term.
- **Monitoring and Feedback**: Closely monitor the performance of your paid online tourism platform, gathering feedback from users and using this information to make adjustments and improvements as needed.

By implementing these strategies, you can create a successful paid virtual tourism platform that offers exclusive and exciting experiences to users willing to pay for premium access to exclusive virtual locations.

6) Virtual metaverse in collaboration with role models or idols to design unique virtual locations – co-creation unique locations

Designing virtual trips in a metaverse in collaboration with role models or idols to design unique virtual locations that reflect their personal vision of ideal or dreamlike places / locations.

Here are some steps to carry out this collaborative design process:

- **Interview and Consultation with the Referent:** Start by interviewing the referent or idol to understand their vision and ideas for the virtual locations they would like to design. Ask them about their dream locations, their values, their interests and the experiences they would like to offer users.
- **Brainstorming and Conceptualisation:** Work closely with the referrer to generate ideas and concepts for the virtual locations. Conduct brainstorming sessions where they can share their ideas and visions, and then work together to refine and develop those concepts.
- **Creating Sketches and Conceptual Designs:** Use the information gathered during the interview and brainstorming to create sketches and conceptual designs of the virtual locations. These can include drawings, sketches, digital mock-ups or even interactive prototypes to visualise the vision of the referent.
- **Iteration and Feedback:** Share conceptual designs with the referrer and solicit feedback. Work together to make adjustments and refinements as needed to ensure that the designs accurately reflect the vision of the referrer.
- **Development and Construction:** Once the conceptual designs have been finalized, work on the construction and development of the virtual locations in the metaverse. Uses virtual design and development tools to create three-dimensional environments that are visually stunning and provide an immersive experience for users.
- **Testing and Evaluation:** Conduct extensive testing of virtual locations to ensure that they function correctly and meet expected quality standards. Solicit feedback and make adjustments as necessary before releasing the locations to the public.

- **Launch and Promote:** Once the virtual locations are ready, organise an official launch and promote them through various channels, including social media, virtual events and collaborations with the referrer to increase visibility and user interest.

By following these steps, you can effectively collaborate with referrers or idols to design unique virtual locations that reflect their personal vision and offer unique and exciting experiences for metaverse users.

7) Co – creation: contract between the referent virtual places / locations and the experience tourism metaverse (xtm)

When establishing a **contract** between the **virtual places / locations tourism metaverse** (XTM) and the referent to design exclusive virtual (inexistent) locations, it is important to contemplate a number of clauses and legal provisions to protect the interests of both parties.

Here are some important clauses to consider including in the contract:

- **Intellectual Property:**

Clearly specify who will own the intellectual property rights to the designed virtual locations, including copyrights, trademarks and any other related intellectual property.

- **Licence of Use:**

Sets out the terms and conditions under which XTM may use the virtual locations designed by the referrer, including the scope of the licence, duration and any restrictions on use.

- **Compensation and Royalties:**

Defines the compensation the referent will receive for its participation in the design of the virtual locations, either through a one-time payment, royalties for continued use, or a combination of both.

- **Confidentiality:**

Includes confidentiality provisions to protect any confidential or proprietary information exchanged between the parties during the negotiation and execution of the contract.

- **Responsibilities and Obligations:**

Details the specific responsibilities and obligations of each party in relation to the design, development, testing and promotion of the virtual locations.

- **Quality and Compliance:**

Establishes quality standards and compliance criteria that virtual locations must meet before being released to the public.

- **Contract Termination:**

Includes provisions describing the circumstances under which the contract may be terminated by either party, as well as procedures for resolving disputes or breaches of contract.

- **Jurisdiction and Applicable Law:**

Specifies the jurisdiction and applicable law that will govern the contract, as well as the procedures for resolving any legal disputes that may arise between the parties.

- **Modifications and Amendments:**

Sets out how modifications or amendments may be made to the contract and the procedures for obtaining the mutual consent of both parties.

- **Signature and Date:**

Finally, ensure that the contract is signed and dated by authorized representatives of both parties to make it legally binding.

It would be beneficial to consult with a lawyer specialising in intellectual property and commercial contracts to ensure that the contract is complete, clear and legally sound, and that it protects the interests of all parties involved.

8) Co –creation design process together with the referent the desired virtual places / locations

Designing, together with the referent, the desired virtual locations implies a detailed and collaborative process to ensure that the visions and preferences of the referent are faithfully reflected in the metaverse. Here is an end-to-end process to follow to ensure a successful design:

- **Initial Interview and Consultation:**

Start with an initial meeting with the referent to discuss their ideas, visions and preferences for the virtual locations. Ask detailed questions to fully understand their expectations and desires.

- **Brainstorming and Conceptualisation:**

Conduct brainstorming sessions with the referrer to generate ideas and concepts for the virtual locations. Encourage the referrer to share their inspirations, dreams and personal experiences that can influence the design.

- **Create Sketches and Preliminary Designs:**

Uses information gathered during consultations to create sketches and preliminary designs for virtual locations. Include specific elements suggested by the referrer and be sure to capture their vision accurately.

- **Review and Feedback:**

Present the sketches and preliminary designs to the referrer for review and feedback. Listen carefully to their comments and suggestions, and make adjustments as necessary to reflect their preferences and expectations.

- **Development and Construction:**

Once preliminary designs have been finalized, begins the development and construction phase of the virtual locations in the metaverse. It uses virtual design and development tools to bring concepts to life and create interactive and immersive environments.

- **Testing and Optimisation:**

Performs extensive testing of virtual locations to ensure they function properly and deliver a seamless, immersive experience. Optimises designs as necessary to meet established quality and performance standards.

- **Referent Avatar Integration:**

Incorporate the referent's avatar into virtual locations in a meaningful and authentic way. Ensure that the referent's avatar is present at key points and that it integrates naturally into the virtual environment.

- **Final Review and Approval:**

Present the completed virtual locations to the referent for final review and approval. Ensure that the referrer is satisfied with the final result and agrees with all aspects of the design.

- **Launch and Promotion:**

Once the virtual locations are approved, organise an official launch and promote them through various channels to increase their visibility and attract users to the metaverse.

By following this step-by-step process and working closely with the referrer, you will be able to design virtual locations that meet their expectations and accurately reflect their visions and preferences in the metaverse.

a. Technological Innovation and Economic Development:

Batlle was an advocate of economic development and technological innovation in Uruguay. In his SMTV, he could include thematic areas dedicated to the technology industry and the promotion of innovative start-ups and entrepreneurship. Users could explore virtual technology parks, participate in conferences on innovation and learn about the technological advances that are transforming the country.

b. Social Development and Education:

Batlle was also committed to social development and education in Uruguay. His SMTV could include virtual educational programmes, digital libraries and interactive learning spaces where users can access quality educational resources and participate in innovative educational activities. In addition, it could highlight social development projects that promote equity and inclusion in Uruguayan society.

c. Sustainable Tourism and Nature:

Uruguay is known for its natural beauty and its focus on sustainable tourism. In Batlle's SMTV, it could include virtual areas dedicated to the promotion of eco-tourism and environmental conservation. Users could explore virtual natural landscapes, participate in ecotourism activities and learn about conservation efforts underway in the country.

d. Culture and Heritage:

As an advocate for Uruguayan culture and heritage, Batlle could include thematic areas dedicated to the promotion of national culture and the preservation of the country's historical and cultural heritage. Users could explore virtual museums, digital art galleries and world heritage sites, and participate in traditional cultural events and festivals.

In short, the virtual tourism sub-metaverse of the Uruguay of Jorge Batlle's dreams could be a space that reflects his vision of a prosperous, inclusive and sustainable Uruguay, where innovation, education, culture and tourism come together to promote the country's integral development.

9) Planning a traditional trip

What are the questions, as a *travel planning platform*, will have to ask the person who is planning the trip?

Comprehensive list of questions that could be useful for a travel planning platform when designing the pre-trip stage from the perspective of the hirer.
These questions should provide a solid basis for understanding the needs and preferences of the hirer when planning their trip. From this information, the travel planning platform could offer personalized recommendations and options tailored to their specific wishes.

- **Destination and Trip Duration:**

Where would you like to travel to?

How long do you plan to stay at your destination?

- **Date and Weather:**

What dates are you planning to travel?

Do you prefer to travel in a specific season or do you have flexibility?

- **Budget:**

What is your budget for this trip?

Do you have any specific spending limits for accommodation, activities, etc.?

- **Accommodation:**

Do you prefer to stay in hotels, flats, holiday homes or other accommodation?

What amenities are important to you in your accommodation?

- **Transport:**

How do you plan to get to your destination?

How do you plan to get to your destination (plane, train, car, etc.)?

Do you need help with booking flights, trains or car hire?

- **Activities and Events:**

What kind of activities would you like to do during your trip (cultural tourism, adventure, relaxation, etc.)?

Are you interested in attending sporting, musical, mystical or academic events during your stay?

- **Dietary preferences:**

Do you have any food preferences or dietary restrictions that should be taken into account when recommending restaurants or meal plans?

- **Personal Interests:**

Are there any specific topics you are interested in exploring during your trip (history, art, food, nature, etc.)?

Do you have any hobbies or activities you would like to incorporate into your itinerary?

- **Travel Group:**

Are you travelling alone or in a group?

How many people will be travelling with you and what are their ages?

- **Special Needs:**

Do you have any special needs that should taken into account when planning your trip (accessibility, childcare, etc.)?

- **Travel Insurance:**

Are you interested in taking out travel insurance for your trip?

- **Documentation:**

Do you have all the necessary documents for your trip (Passport, visas, special permits, etc.)?

- **Language and Culture:**

Do you speak the local language of the destination or do you need assistance with translation or tour guides in your language?

- **Time preferences:**

Do you have specific time preferences for your activities during the trip?

- **Itinerary Flexibility:**

Are you open to last-minute changes in your itinerary or do you prefer to have everything planned in advance?

Some additional questions to include in the pre-trip stage, considering more detailed preferences:

- **Musical Preferences:**

What genres of music do you like, are there any specific artists or bands you would like to see during your trip?

Are you interested in attending live concerts, music festivals or events related to local music?

- **Gastronomic Interests:**

Do you have an interest in local cuisine and are there specific dishes or restaurants you would like to try during your trip?

Do you have any local dietary preferences such as vegetarian, vegan, halal, etc.?

- **Cultural Interests:**

Are you interested in exploring the local culture of the destination? What cultural aspects would you like to experience?

Would you like to participate in cultural activities such as cooking classes, craft workshops, museum visits, etc.?

- **Historical Interests:**

Do you have an interest in the history of the destination? Are there specific historical sites you would like to visit?

Would you like to take guided tours or activities related to the history and heritage of the place?

- **Experiential Experiences:**

Are you interested in authentic, local experiences during your trip? What kind of experiential experiences would you like to have?

Are you interested in participating in activities such as homestays, cultural exchanges or volunteering during your trip?

- **Family Group Preferences:**

Are there specific activities or services that are important for the comfort and enjoyment of the family?

Are there special considerations to meet the needs of all members of the family group?

- **Adventure and Activity Level:**

Do you enjoy adventure activities and extreme sports and are you interested in including any such activities in your itinerary?

Do you prefer a more relaxed and laid back approach during your trip, or are you looking for thrills and adrenaline?

- **Accessibility and Physical Restrictions:**

Do you have any physical restrictions or reduced mobility that should be taken into account when planning your itinerary?

Do you need additional assistance or special services to ensure your comfort and safety during your trip?

10) Ethical, design and functional issues – pre – trip stage

Developing a metaverse to plan trips to real or create places / locations involves considering a variety of ethical, design and functional issues to ensure a positive and safe experience for users.

Ethics:

- Cultural Respect: Ensure accurate and respectful representation of the culture and traditions of the destinations emulated in the metaverse.
- Data Protection: Implement strong privacy and security measures to protect users' personal and financial information.
- Accessibility: Design the metaverse to be accessible to people with physical or sensory disabilities.
- Inclusion: Encourage diversity and inclusion in all representations and experiences within the metaverse.
- Sustainability: Promote sustainable and environmentally friendly practices within the metaverse and in the actual destinations being emulated.

Purchase / Payment Gateway:

- Payment Security: Use secure and encrypted payment methods to protect users' financial transactions.
- Ease of Use: Design an intuitive and user-friendly interface to facilitate the navigation and purchase of products and services.
- Price Transparency: Clearly and transparently display the prices of products and services offered in the metaverse.
- Payment options: Offer a variety of payment options to suit users' preferences, including credit cards, bank transfers and cryptocurrencies.
- Consumer Protection: Ensure that consumer protection laws and regulations are complied with in all transactions conducted within the metaverse.

Design:

- Realism: Create realistic and detailed visual representations of the actual destinations emulated in the metaverse.
- Interactivity: Incorporate interactive elements that allow users to explore and experience the destinations in an immersive way.
- Personalisation: Provide customisation options so that users can tailor their experience according to their individual preferences.
- Intuitive Navigation: Design a clear and easy to understand navigation system so that users can move seamlessly through the metaverse.
- Cross-Platform Optimisation: Ensure that the metaverse is compatible with a variety of devices and platforms to ensure a consistent experience for all users.

Security:

- Fraud Prevention: Implement security measures to prevent fraud and identity theft within the Metaverse.
- Harassment Protection: Establish policies and tools to prevent and address harassment and inappropriate behaviour among users.

- Parental Controls: Provide parental control options to ensure the safety of younger users who may access the metaverse.

Legal and Regulatory:

- Regulatory Compliance: Ensure that the metaverse complies with all applicable laws and regulations in the jurisdictions where it operates.
- Intellectual Property: Respect intellectual property rights and obtain the necessary licences to use copyrighted content within the metaverse.

Considering these ethical, design and functional aspects during the development of the metaverse will ensure a positive and safe experience for users, while complying with the necessary ethical and legal standards.

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