RESEARCH ARTICLE

Blockchain Technology and The Future of Tourism: A Critical Analysis of The Positive Impacts of Metaverse on The Tourism Sector

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Abstract: Tourism is one of the most important sectors of the global economy. With technological advancements, and the developments in Blockchain technology, the businesses in the touristic sector are now depending on the technology to maintain a highly competitive background, the metaverse tourism. The rise of Augmented reality (AR) and Virtual reality (VR) has impacted this sector negatively and positively. When tourists need to visit a destination, they already have their expectations and what to wait for, since they can visit the site virtually and can priori to their physical visit. Nevertheless, the technology is somewhat unfamiliar. Futurists predict that metaverse tourism has a great potential to revolutionize traditional tourism processes. By 2026, it is forecasted that the sector will have a market size of $188.24 billion and a CAGR of 26.01%. Now, this new technology has only been recognized by bigger tourism companies. Despite the scholarly speculations that metaverse will alter the operations of tourism industry, efforts to understand the technology in both industry and academia are at crossroads. This research seeks to answer the question: “What are the positive impacts of Blockchain technology, metaverse, on tourism and how will it impact the future of tourism?” In this opinion piece, the research explains the metaverse concept in the context of the tourism industry and presents a conceptual framework for the creation of metaverse experiences. The study employs secondary literature analysis as a research method to analyze how the concept has altered the tourism industry. The findings show that metaverse technology influences consumer attitude by redefining booking experiences and creating VR and AR experiences. The technology also allows decentralization and traceability, smart contracts and planning for tourism activities. These increase the likelihood of the reception of metaverse technology in the tourism industry, and in this process, the stakeholders' perceptions will change. Therefore, it can be acknowledged that the metaverse can and will impact the tourism sector in the future.

Keywords: Tourism; Blockchain Technology; Futurists; Augmented reality

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1 Introduction

In recent years, contemporary tourism and the world's economy are experiencing technological disruptions, and the impacts have megatrends on business processes and tourism activities (Heid, 2013). The significant changes in the tourism industry not only arise from global COVID-19 travel restrictions but also from the evolution of the metaverse and innovations in the digital sphere. Besides affecting the social, political and economic changes in recent times, the metaverse evolutions, the blockchain technology, are also influencing dynamic tourism surroundings, with the incorporation of the innovative approach to the business in future. Virtual tourism experiences continue to grow consistently despite the approaching pre-pandemic levels of conventional travel. Buhalis and Karatay (2022) state that Metaverse and its associated virtual experiences have led to the radical alteration of people's conceptions of blockchain technology's potential impact and future on the tourism industry. Businesses in the tourism industry have developed the urge to explore ways to capitalize on

virtual tourism and metaverse experiences, services and products for their clients. Internet 3.0 has enabled metaverse technology focusing on social connections and a three-dimensional virtual space for clients (Melkić and Čavlek, 2020). Metaverse evolution has created a sense of presence, thereby attracting attention from the tourism sector. This research incorporates a secondary research method to critically analyze the impacts of the metaverse, blockchain technology, and the future of tourism.

In this era, clients increasingly opt for metaverse tourism services and experiences. For instance, Melkić and Čavlek (2020) claim that virtual flight services by Japan-based First Airlines have commenced in Tokyo with 100% occupancy to multiple destinations, including New York, Paris, Rome and Hawaii. In addition, the National Geographic VR subscription allows people to virtually kayak Antarctica icebergs or explore Machu Picchu treasures using Oculus VR gear (Gursoy, Malodia and Dhir, 2022). Besides, for every location mapped in Google Street View, "Wander" allows people to walk through such areas. Another is Wikipedia integration which uses location-based information for users to walk to their favorite destinations. It allows time-travelling for individuals to witness change since 2005 when integration was launched. Other virtual tour opportunities include virtual participation in the Arctic Circle expedition by Dallas Seavey. Suchlike metaverse applications revolutionize the tourism experiences as they influence how clients attend concerts and make bookings. With the quality of virtual reality headsets, the tech-savvy and digital native consumers have been driven. Metaverse, a virtual globetrotting, is thus set to become an integral augment of the tourism sector in multiple ways. On the other hand, stakeholders in the tourism industry are puzzled by the impacts of metaverse technology on the future of tourism? How does metaverse transfer real-life experiences? Should organizations buy the idea of metaverse evolutions in the tourism industry? In response, this research provides how the metaverse evolutions have impacted tourism and discuss how the technology will impact tourism in the future.

1.1 Problem Definition

Before Covid 19, there was rapid growth in the tourism industry. The total number of tourists was forecasted to increase by 3% yearly from 2010 to 2030, reaching 1.8 billion (Lee, 2022). It is estimated that by 2030, the tourism industry will be equivalent to 9% of the world GDP. Due to the industry's ripple effects on other sectors, every tourist creates about 10 new jobs. Therefore, agencies and governments have made efforts to improve the tourism industry.

Nevertheless, agencies and governments have faced crises from the outbreak of Covid 19. The pandemic led to border closures, blocking of cities and tourist attraction sites, and quarantines for tourists. To restrain the spread of the outbreak, in the first half of 2020, 11% of the countries formulated partial immigration measures, while 81% formulated regulations for tourist border closures (Lee, 2022). Tourists were to be quarantined for two weeks. In 2020, the 1.4 billion international travelers declined by 67%, and the market size for the tourism industry reduced by over 70% compared to the past year, regressing to a market size it was about 30 years ago (Zaman et al., 2022). This does not mean that tourists' needs for new experiences have decreased, but there is the need to rely on metaverse, a blockchain technology, to experience sightseeing without having physical reach outs to tourist attractions.

According to Zaman et al. (2022), during the pandemic, the quarantined tourists experienced virtual tourism content such as Victoria Falls and The Cliffs of Moher, which are provided in the form of 360-degree images through virtual technology. In Korea, this form of travel is known as 'LAN-line tourism,' which is described as 'virtual travel,' (Wei, 2022). Agencies and governments want to embrace virtual travel content to attract tourists after the Covid 19 pandemic. Additionally, due to Covid 19, other tourists could not plan touring activities effectively. They could not engage in memorable and pleasant experiences. To a few, there were fraud and misinformation from unreliable intermediaries (Zaman, 2022). Similarly, companies could not market their

services effectively as this was caused by a lack of smart negotiations. There were incidences of centralized tourism services that were untraceable.

Prior researchers found that blockchain technology is effective for online gaming and shopping for delightful tourism experiences. However, there is insufficient research investigating the impact of metaverse technology in tourism. Therefore, this research attempts to verify how metaverse technology will impact tourism in the future.

1.2 Research Questions

• How does Blockchain, metaverse technology, influence consumer attitude towards tourism?

• How does metaverse technology influence the planning of tourism activities?

• How does Blockchain technology affect intermediaries, the development of smart contracts and the spread of digital currencies in the tourism industry?

2 Background Analysis

2.1 What is Metaverse?

In 1970, Space Shuttle proposed the notion of contemporary space tourism. It was a commercialized activity designed for 74 guests as essential experimental equipment for a Space Station and leisure and space research for the guests (Rana, Adamashvili and Tricase, 2022). In 1992, N. Stephenson defined “metaverse” in his science fiction novel Snow Crash. He envisioned virtual reality environments and life-like avatars in 3D buildings. The concept further to 1909 a book titled, Machine Stops by E. Foster. In this book, all human needs (shelter, nutrition, light and clean air) are all provided by a complex global machine (Gursoy, Malodia and Dhir, 2022). A century after Machine Stop’s publication, Facebook rebranded as “Meta,” and since then, “metaverse" has increasingly garnered interest (Kim, 2021). Foster's metaverse concept represents a society where a global machine controls survival. The metaverse concept, a digital world in which life-avatars build in 3D environments, aligns with Stephenson's Snow Crash (Caulfield, 2021; Ball, 2021).

In simple meaning, the metaverse is a parallel reality that synthesizes all virtual worlds that people can traverse. According to Herrman and Browning (2021), today, the metaverse allows users to inhabit the internet. Human experiences with Covid-19 led to real-time interactions and sharing experiences with millions of others. The metaverse is a world where any experience is accessible and possible.

2.2 Dimensions of Metaverse Experiences

Players in the tourism sector have exhibited innovation and ingenuity to create clients' immersive experiences. Such experiences are conceptualized using four quadrants and a two-dimensional framework.

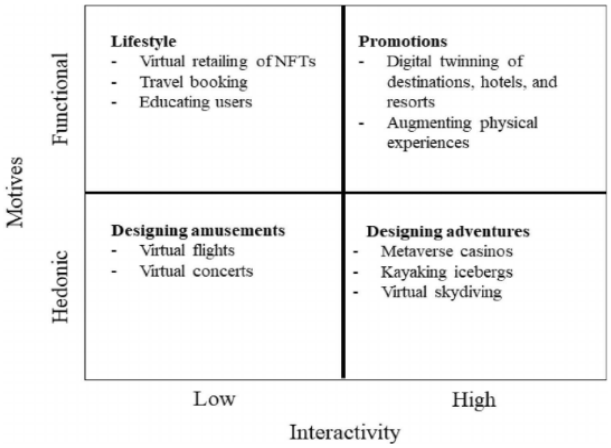

Figure 1 Creating Metaverse Experiences.

As shown in figure 1, the first dimension represents the level of interactivity, low to high. In low experiences, clients engage with virtual services and products by obtaining passive information. In contrast, in highly interactive, clients actively participate in the virtual environment (playing shooter games or kayaking). According to Kim (2021), the second dimension represents motive metaverse experiences (hedonic vs. utilitarian). Hedonic motives involve doing virtual experiences for pleasure (i.e. experiences by virtually diving or escaping into the Pacific Ocean or Amazon rainforest, respectively). Utilitarian motives involve satisfying functional needs in the virtual world (i.e. satisfying the clients' functional needs to try before booking or buying). Metaverse experiences include hotel rooms, flight and food preparation experiences entirely virtually (Rana, Adamashvili, and Tricase, 2022). Air travel companies like Boeing work with 3D engineering

designs to construct airline services in the metaverse. These provide clients with opportunities to "try before you buy" function, which enhances the exploration of the hotel and flight services (Melkić and Čavlek, 2020). Metaverse offers several opportunities to clients and tourism organizations. It saves time and money and is important for customer relationships and marketing opportunities. Transforming traditional tourism to virtual tourism is limitless. With metaverse technology, individuals can stroll art galleries, enjoy concerts, and visit museums in the digital world. Even though real-world tourism is unlikely to be replaced by virtual experiences, the predictions remain optimistic. Hence, several industry leaders have consistently begun investing in the digital landscapes, and the metaverse trend will accelerate tourism in future.

2.3 The Metaverse and the Tourism Sector

The Ukraine war and Covid 19 have demonstrated vulnerabilities in the tourism industry. Awareness of changes in climate, generational shifts, needs and wants have also made people to patronize tourism to visit domestic and not international places. Shifts in clients' attitudes have led to realistic tourism experiences in the metaverse while saving money and time. With technological advancements, metaverse applications will continue to enhance guest, client decision-making, communication and marketing processes (Gursoy, Malodia and Dhir, 2022). Tourism metaverse is the current and the next disruptive blockchain technology in the tourism sector. With a collection of 3D-simulated artificial environments, metaverse has consistently fostered social interaction in virtual space tourism. VR and AR have gained many spotlights, thus easing many possibilities for everybody. With the access to internet and computer, everybody has the privilege to virtually access space with the advent of the metaverse. Some virtual-reality-based space exposures include VR-based Mars mission, VR moon-base experience and VR spacewalk. The global online travel market has exponentially developed.

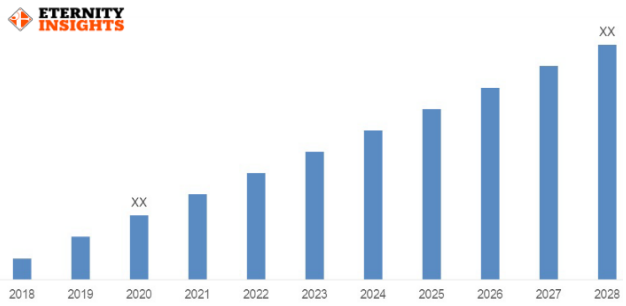

Figure 2 Global Metaverse in Tourism and Travel 2018-2028 (USD$).

With metaverse technology, customer expectations have changed significantly. According to Emergen Research (2022), tourism has become the most expanding economic sector in the last few decades due to its steady growth. International visitor arrivals expanded by 59%. This was from 880 million to 1.5 billion in 2009 and 2019, respectively.

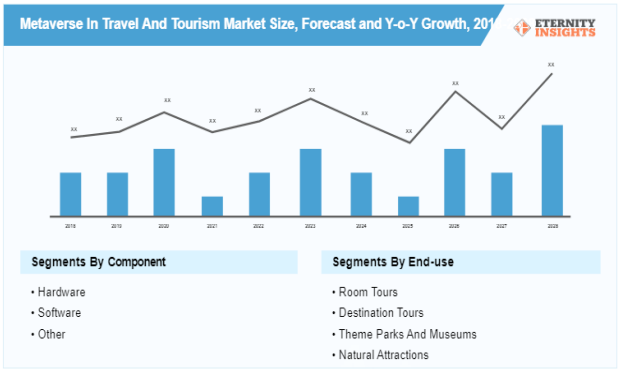

Figure 3 Global Metaverse in Tourism and Travel Market Taxonomy.

Similarly, it is projected that in 2026, the metaverse market size will be valued at $188.24 billion. On the hand, Eternityinsights.com (2022) forecast that CAGR will be at 26.01%. Geographically, the metaverse tourism industry covers areas including Africa, the Middle East, South America, APAC, Europe and North America. The metaverse vendors include Marriott International, Accenture Plc, Mytaverse Inc, LynKey NFT, ARV cryptocurrency and Color World App.

Readiness and acceptance of travellers to metaverse tourism have led to high consumption of technology-enabled services (TES). Customers have developed positive effects on TES, thus positively influencing clients to use e-tourism

applications. This has led to high technology readiness index (TRI) (Dodd and Johnson, 2009). Clients have shown their satisfaction with metaverse tourism, as is illustrated by the technology acceptance model (TAM). With the availability of numerous tools to enjoy, manage and organize virtual tourism experiences, consumers have developed positive behavioral intentions and attitudes towards space tourism. This has leveraged a new spirit for digital tourism, which has led to its acceleration in the recent two decades.

Table 1 Developments in Metaverse Platforms

Strategic Development	**Duration**	**Purpose**
Creation of 3D business metaverse by Mytaverse (Emergen Research, 2022)	November 2021	Mytaverse created the platform to offer training, showrooms, events and meetings (Emergen Research, 2022). Mytaverse aimed to reduce travel hassles, jet lag and airport security screenings.
Marriot Bonvoy by Marriot International (Emergen Research, 2022)	December 2021	Marriot Bonvoy featured 30 hotel brands to create an endless NFT campaign (Emergen Research, 2022) .
NFTs project by LynKey	January 2022	LynKey launched the NFT metaverse solution for tourism and travel at US$8 billion (Eternityinsights.com, 2022).
ARV cryptocurrency	January 2022	Ariva partnered with World Tourism Forum Institute and Global Tourism Forum to leverage the accepted cryptocurrency, ARV.
Samsara NFT	Set to be launched in the second quarter of 2022 (Emergen Research, 2022)	Samsara Luggage debuted its NFT Brand Ambassador for the upcoming marketing campaign in the second quarter of 2022.
Color World Metaverse Platform	February 2022	Color Star Technology collaborated with Jilin Great World Aviation Service to offer Color World App (Emergen Research, 2022). The metaverse platform would offer virtual corporation and virtual ticketing in hotels.

Readiness and acceptance of travellers to metaverse tourism have led to high consumption of technology-enabled services (TES). Customers have developed positive effects on TES, thus positively influencing clients to use e-tourism applications. This has led to high technology readiness index (TRI) (Dodd and Johnson, 2009). Clients have shown their satisfaction with metaverse tourism, as is illustrated by the technology acceptance model (TAM). With the availability of numerous tools to enjoy, manage and organize virtual tourism experiences, consumers have developed positive behavioral intentions and attitudes towards space tourism. This has leveraged a new spirit for digital tourism, which has led to its acceleration in the recent two decades.

3 Literature Review

Metaverse technology has resulted in the acceleration of digitization of the tourism sector. Metaverse evolutions and adoption have led to several advantages in the tourism industry. This chapter conducts a literature review of the scholarly sources. From the analysis, it is clear that several sources show the positive impacts of metaverse technology on tourism and its implementation. The sources also describe how the diverse blockchain is of help to the tourism sector. Consequently, the metaverse implications will also positively affect tourism in the future.

3.1 Experience Tourism Theory

The experience tourism economy has dominated tourism philosophy as it permeates the clients' engagement with tourism with their consumption behavior (Martechvibe, 2022). With virtual reality and the 3D touring experiences, tourists encounter a whole range of cultural, holiday and cutting-edge leisure experiences. Augmented reality allows tourists to revitalize, enjoy and enrich their daily activities. Yeoman and McMahon-Beattie (2019) suggest that metaverse technology has allowed tourists to acquire new skills and become experience seekers. For example, Marriott Hotels uses the Kabaq app to enable consumers to navigate interactive menus by viewing the dish ingredients and portion sizes in 360 dimensions (Yeoman and McMahon-Beattie, 2019). This way, the clients have an easy way to

make their dish choices and spend less time making dish decisions. Metaverse technology has led to an authentic capitalist asset that has solidified personal positioning in the realm of fascinating. The collection of unique experiences develops a lasting memory by boosting clients' interests in uninvested and rarer places. Virtual reality also aids exploration that leads to clients' attraction. For navigation purposes, clients can use The Smithsonian's Skin and Bones app to scan animal skeletons in their natural museums (Dodd and Johnson, 2009). This way, the clients have live representations of scarce and extinct species. With such exceptional experiences, the metaverse technology will make clients crave off-the-beaten-track and immersive experiences.

3.2 Advantages of Metaverse Tourism

Every accommodation facility may utilize digital avatars or virtual reality tours, allowing guests to walk through the property and feel the available amenities. This is an inspiration to travellers who gain virtual reality experiences; therefore, the clients are free to make their bookings. Martechvibe (2022) explains that Metaverse has superseded traditional advertising by creating more engaging brand experiences. It has improved marketing and sales within the tourism sector by giving marketers an upper hand that is more thrilling. The technology provides clear booking procedures that every customer understands. With clear communication and relevant protocols, metaverse technology will make clients have a higher probability of booking than cancellations (Gursoy, Malodia and Dhir, 2022.). The virtual tours have led to elasticated experiences with irreversible and unique client experiences.

Blockchain technology has aided in addressing issues of big spending and long-distance tourism. Martechvibe (2022) states that augmented reality has enabled consumers to take far-flung tours in perhaps unusually expensive virtual destinations. The delightful experiences are marketing promotions to the tourism industry. This is because clients share the vacations with their friends, who will have to make several bucket lists. Why should a young Californian backpacker assume that s/he will only visit Machu Pichu once (Yeoman and McMahon-Beattie, 2019)? The fast-growing blockchain technologies have defined the usage of modern technologies in tourism. With metaverse technology, credibility and information content exchange occur in real-time and are fully interactive. In the study, Gursoy, Malodia and Dhir (2022) claim that AR and VR have changed the way clients engage in pre, post and in-trip travel ecosystems, thus accelerating the integration of metaverse in the tourism sector. Metaverse will continue to directly impact the future of tourism, especially in tourism intermediation. Metaverse has encouraged P2P tourism with the help of legal and human infrastructure. It is a strategic comparative advantage that ensures better information sharing and greater business productivity.

3.3 Challenges of Metaverse Tourism

Blockchain technology is also characterized by some disadvantages in the tourism industry. Rana, Adamashvili and Tricase (2022) claim that when clients provide their booking details online, there is a risk of hacking by unethical intruders who utilize their high computational hacking potential to manipulate users' information. They initiate denial-of-service attacks (DoS) that reduce the BC efficiency. However, the development of flawless smart-contract code has aided in preventing such exploitation of clients' information. Blockchain developers have consistently developed the BC systems and permissions to have definite authentication member nodes. This improves BC efficiency in global metaverse tourism. In response, Rana, Adamashvili and Tricase (2022) propose Eges, a novel protocol, to hide the authenticated member nodes in fake committee nodes to ensure resistance to network partition attacks and DoS. Additionally is the loss of privacy. In BC, metaverse tourism, the data content is at risk as clients may input inaccurate data or even false information. The errors may arise from mistakes in the description of physical resources during data input in the blockchain. This may make the stakeholders lose trust in the metaverse platform. To increase reliability, there is a need to integrate the Internet of Things (IoT) with

physical resources (Martechvibe. 2022). Besides the iterative bilevel hybrid intelligence model, ManuChain would ensure system sustainability in metaverse tourism.

Figure 4 Challenges in Metaverse Tourism.

Raluca-Florentina (2022) argues that problems relating to lack of BC knowledge and issues of interoperability of the heterogeneous BC technologies would lead to challenges during implementation. This happens with single-chain platforms that cannot closely connect when needed. An example is where users cannot select a less-congested BC network to transact operations. Rana, Adamashvili and Tricase (2022) conducted an in-depth interview with 18 business individuals in the Swiss tourism economy that revealed how lack of technical knowledge might lead to competition and lack of cooperation. This hinders the interoperability of the BC technology in tourism. According to Yeoman (2013), multichain platforms should be implemented to enhance diverse services and interactions. There are also cases of intermediaries who provide coins or tokens in the case of cryptocurrency spread. This can be solved by developing smart contracts and effective governance systems.

4 Methodology

The research study to investigate blockchain technology in tourism's future uses secondary data sources. The research study depends on past studies on the use of blockchain technology in future tourism. Specifically, it analyses the positive impacts of Metaverse on the tourism sector by considering past literature studies. It examines the journal articles, reports, and books related to the topic under investigation. The study will use the systematic review approach to answer the established research questions.

4.1 The Systematic Literature Approach

The systematic literature review informs the research study by drawing on the current and existing knowledge in a particular field of study. The literature review uses various repositories, including professional and academic journal articles, books, and web-based sources (Ali and Usman 2018). This research aims to identify how blockchain technology can improve the future of tourism. As a result, this systematic literature review will be the primary approach used in this research project to assess how Meterverse impact positively on the tourism sector. According to Eriksen and Frandsen 2018), a systematic literature review involves a comprehensive, in-depth assessment of various data and information concerning a topic under investigation. According to Ali and Usman (2018), the systematic literature review is the appraisal of past research studies related to the chosen topic of the study, Mendes et al. (2019). The literature reviews thus play an essential role in describing, summarizing, evaluating, clarifying, and integrating the content of the primary reports.

4.2 The Process

Based on the aims and objectives developed for the research study, the search strategy was initiated to help identify the appropriate literature required for the study (Galavotti 2019). The search strategy used selected keywords to search the database on the internet and minimize biases. The search process employed the use of keyword search because it is acknowledged by Eriksen and Frandsen (2018) in the research study. The keywords can generate several results related to the topic under investigation. It uses the right types of key terms to generate relevant articles. The keyword search was considered appropriate instead of accessing the library, which can have a small collection of information and data (Ali and Usman 2018). The research

considered the articles that were published between 2018 and 2022. The keywords used to search the relevant articles for the study include the impact of blockchain on tourism, Blockchain and tourism, Meterverse and Tourism, and the impact of Meterverse on tourism. The appropriate search process should involve a series of steps and procedures and include the identification of the topic, keywords, and search criteria.

The research papers obtained from the search strategy were subjected to further inspection by observing and reading the title and abstract to determine their significance to the study. Also, the list of the reference books used in the academic journals was examined to get more relevant books, journals, and reports. The number of literature found in journals, articles, books, and reports was arranged based on the year of publication from 2018 to 2022.

4.3 Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were used to help identify the appropriate papers to use in the study. The inclusion and exclusion criteria are used to identify the literature review used in the research study (Patino and Ferreira 2018). The search strategy will consider both the exclusion and exclusion criteria. The exclusion and inclusion criteria aim to identify the best literature reviews that adequately cover the research topic of the use of blockchain technology in the tourism sector (Moloney and Shiely, 2019). The relevant books and journals related to the subject will be considered in this research study.

In selecting the relevant data and information to be used in the study, the inclusion standard was considered appropriate for the research study. Tod (2019) defined the inclusion criteria outline the basic statistics used to help categorize the potential subjects included in the study. Since several papers were identified, the study considered only the ones published between 2000 and 2020. The papers that were excluded from the study were the ones that were not published between 2018 and 2022. The inclusion and exclusion criteria ensured that the papers considered for the research study were relevant and significant (Mendes et al., 2019).

Table 2 The inclusion and exclusion criteria as shown in the table below

Keywords Used to Search Sources	The impact of blockchain on tourism Blockchain and tourism Meterverse and Tourism The impact of Meterverse on tourism
Inclusion Criteria	Academic journals, peer and scholarly reviews, books. English language, open access
Exclusion Criteria	Books published outside specified data that range from 2018 to 2022, a publication not in English, anonymous publications

5 Results and Analysis

5.1 Metaverse influences consumer attitudes towards tourism

Metaverse has a significant influence on the consumer attitude towards tourism. In the tourism world, the metaverse is described as an analogous virtual universe that draws on the ambient intellect to enrich the physical services, products, and spaces to appear as a joint, mutual virtual space for value co-creation. According to the study results, metaverse in tourism amalgamates both augmented and virtual reality with physical reality to congregate the shareholders and needs in a pooled 3D virtual space (Alcañiz, Bigné and Guixeres, 2019). Thereafter, it boosts the physical spaces of both the VR and AR places, transforming the internet into a corresponding virtual world.

As a 3D virtual world, the metaverse allows people to gain experience in an economic and social niche similar to the actual world. As a result, metaverse has gained fiery attention in the hospitality and tourism industry, given that social touching and physical engagements or travels are limited due to the outbreak of the Covid-19 epidemic. Since its commercialization as a Second Life in fiscal 2003, metaverse was first known in 1992 when it appeared in the Snow Crash by Neal Stephenson. Nevertheless, it became virtually difficult for firms and people to dynamically participate in the metaverse because the public lacked interest, and the ICT level was limited (Gretzel, Werthner, Koo and Lamsfus, 2015). Companies and individuals can actively and freely engage in metaverse via Wi-Fi and

smartphone.

5.1.1 Augmented Reality Tourism Experiences

From the study results, 84% of tourists and travellers across the globe are interested in making use of augmented reality (AR) in their respective travelling experiences. On the other hand, 42% of the study participants believe that AR and VR form the future of travel or tourism. The augmented reality users seem to have digital applications incorporated into their real experience of the actual globe (Jung, tom Dieck, Lee and Chung, 2016). Therefore, augmented reality users can travel around the world virtually using AR potentials at a destination through experiencing the improved destination attributes installed in their digital devices. The study reveals that the most widely used AR application among tourists is Pokemon Go (Egger and Neuburger, 2020).

The AR appears to be widely defined through protected real tourism experience offered via images generated using computers such as digital tools anchored on the physical globe niche. AR offers interactive content through smartphone cameras, allowing tourists to experience the real world. As such, AR increases the attractiveness of tourism. The tool enables tourists to engage other users in the real world by offering extensive reality experiences, including niche-related historical figures or images that guide tourists (Wei, 2019). Those involved share their experiences on a common network, flawlessly linking the virtual and actual world-based metaverse. Thus, the study found that with the emergence of global pandemics such as Covid-19, AR was critical in offering tourists memorable, context-specific, unique, and profound experiences.

5.1.2 Virtual Reality Tourism Experiences

The study findings indicate tourists started to use VR technology to gain experience of tourist destinations without being directly in touch with such attraction sites. The study also established that VR proved effective in gaming and online shopping or marketing contexts. According to the results, VR in tourism significantly led to positive word of mouth intentions, destination visit intentions and increased satisfaction. For instance, tourists under quarantine can use VR tourism content such as natural landscapes, including the Victorian Falls and Cliffs of Moher, that are made available in 360-degree images enabled via the VR technologies.

Travel agencies use VR technologies as an auxiliary or alternative means of real tourism to offer access to tourism services and products. The study established that it mainly occurred where real tourism is limited, such as in cases where tourists could hardly visit the actual tourist sites or destinations. For instance, VR technology allows tourists to compare static images and virtual reality tools. These make travellers understand the tourism products and services better, compare services proficiently, constantly revisit the web pages, and feel more worthwhile. The study results indicate that VR attracts tourists' attention, creates a positive attitude, and increases tourist flow. Tourists are more willing to purchase a tourism product or service. That is, VR increases purchase intention. The study findings verified the use of virtual reality in games. VR technology reduces the quest to travel and physical contact with tourist destinations.

5.1.3 Redefined Guest Booking Experiences

According to study findings, with the advent of metaverse (AR and VR) technology, tourists can now make prior booking arrangements with tourism agencies. The pre-bookings occur virtually. Tourist products that can be booked in advance include hotels, tourist vans, wardens and lodges. The travelling journey for customers is now extraordinary and enjoyable. For instance, assisting technologies such as the ticket booking system have increased the level of experience for different customers (Mariani and Borghi 2018). Through metaverse, the booking costs are moderate, anticipated, and limited. Besides, the study participants asserted that before commencing the journey, the VR and AR tourism technologies offer essential information on the available tourism programs and activities founded on clients' scheduling and interests.

5.2 Planning for Tourism Activities

Metaverse tourism is critical in reducing tourism expenses for travel firms. Most tourism companies

consider metaverse a cost-effective approach for reducing or minimizing tourism expenses. For instance, the study found that VR technology can be used by advertising tourist attraction sites to promote their destinations virtually via existing TV advertisements and newspapers (Cox et al., 2009). VR tourism contents significantly value the simple actual world destination advertising approach.

In the tourism sector, the leadership agreed that they are currently moving from airlines, hotels and guides to content developers and tourists through VR technology. Self-determination is used in choosing the preferred destination when selecting VR tourism content and planning for tourist activities, products and services. Contents of VR tourism are supposed to be customized for every tourist. For instance, tourists or clients feel contented when high-quality tourism products or services (Cox et al., 2009). Thus, tourism marketers and planners use metaverse to identify the potential needs of tourists to develop aesthetic and interesting tourism content.

5.3 Smart Contracts and Cryptocurrencies

Tourism firms receive customers across the globe. The study found that most tourism firms use distributed ledger or blockchain to offer interoperable, trustworthy, secure, transparent, and immutable solutions when delivering tourism services and products (Çapar, 2020).

5.3.1 Ecotourism and Digital Detoxification

The metaverse, anchored on hyper-association, does not merely gratify the social drive for human interaction and embodies involvement in the actual universe. Still, it also proffers an unmatched planetary where travellers or tourists can express themselves via avatars, a novel self, dissimilar from an individual in the actual universe (Gretzel, Werthner, Koo and Lamsfus, 2015). Thus, according to the study findings, the transcendent features of the metaverse play a triggering role, allowing different areas, namely education, marketing, and tourism, to identify and adopt AR and VR as the novel model for business.

The past years have witnessed the move from physically visiting tourism destinations to embracing virtual tourism. That is, the business scope of tourism has moved from being offline to being web-based or online. Today, the focus is shifting from being based on websites to AR and VR or metaverse. The move has led to the detoxification of digital platforms (Kwok and Koh, 2021). This is apparent in a smart tourism city. Smart tourism or ecotourism allows the tourism industry to adopt the technology-focused on-site tourism involvement at a given tourism site or destination.

Ecotourism enables smart tourism and provides inventive tourism sites with sustainable development and minimal toxicity. Integrating digital platforms or technology in tourism minimizes contact with tourist destinations. The resultant effect is that tourists are offered convenient experiences, and the quality of life for the residents is enhanced by sustaining the ecosystem (Gretzel, Werthner, Koo and Lamsfus, 2015). Digital technologies used in VR and AR tourism optimize resource efficiency, reduce digital toxification, and enhance tourist attraction gratification.

5.3.2 How Cryptocurrencies Support Tourism

Through cryptocurrency technology, tourist firms can be secure, transparent and affordable services and products to tourists or travellers. For instance, according to study findings, cryptocurrencies offer blockchain-enabled digital payment platforms for facilitating direct, faster and secure payments (Çapar, 2020). These minimize hassles common with transaction delays, currency inflation, and bank intermediation.

5.4 Decentralization and Traceability

Based on study findings, the tourism information is decentralized using blockchain technology which keeps the information in a single safe place. The data are transparent to every tourist in the safe and can hardly be manipulated. Besides, the results show that the network shares numerous accounts and cannot encounter susceptibility or experience any failure (Lee, 2022). Thus, there is no single vulnerability source to document information saved by tourism firms. The information stored in the blockchain seems time-stamped and traceable (Buhalis and Karatay, 2022).

The positive impacts of metaverse on the tourism sector

from the secondary literature analysis is illustrated in table 3 in appendix.

6 Discussion

6.1 Metaverse Influences Consumer Attitudes towards Tourism

With recent technological advancements, metaverse has become widely used in travel companies (Novak, & Hoffman, Yung, 2000). As a result, the metaverse continues to positively impact consumer attitudes towards tourism. For instance, it unlocked the metaverse tourism prospects that business ventures in the tourism industry or sector have been kept to capitalize on both now and in the long run. The metaverse concept currently enjoys vast application in augmented reality tourism experiences, virtual reality tourism experiences, and redefined guest booking experiences, which form the basis of the discussion.

6.1.1 Augmented Reality Tourism Experiences

In the past few years, augmented reality appears to have seen a breakthrough as a result of the advancement of smartphone technologies. It is of great importance that marketers and businesses use AR as a tool that permits them to alter how clients perceive the global business niche (Tseng and Wei, 2020). The travel industry has particularly benefited from this, given that those operating in the tourism sector mainly sell physical environments or experiences that can only be enhanced through AR. The most outstanding case of AR application commonly used in the tourism and travelling industry is Pokemon Go. In most instances, AR technology has been extensively used in other fields, including marketing and gaming. For example, AR is widely applied by marketing teams to incorporate useful information or data, and graphics to a particular surrounding observed via a compatible tool or device (Hsu et al., 2022). Usually, AR can be experienced using tablets, smartphones or similar tools. The Hub Hotel from Premier Inn, UK, has integrated AR and interactive mapping system placed in hotel rooms that enhance users' experiences and choices by providing additional information about enjoyable local places within the hotel (Lee, 2022). Similarly, Holiday Inn has developed AR experience as guests use their phones to see realistic virtual depictions celebrities in the hotel (Wei, 2022). Therefore, AR appears inexpensive to customers compared to devices or headsets, which are virtual reality-enabled. In most instances, augmented reality works jointly with additional mobile tools such as GPS tracking and cameras.

Augmented reality is a metaverse technology that alters how individuals perceive the physical environment whenever it is observed via a specific tool or device (Wei, 2022). Even though AR hardly replaces the actual global niche, the technology is almost identical to virtual reality. However, AR augments the physical surroundings by superimposing digital elements.

In general, individuals and groups accountable for the management of tourism businesses as well as tourism management normally long to explore the best approaches in which augmented reality (AR) should be used in offering metaverse tourism experiences and solutions. A key illustration can be seen where augmented reality applications and smartphone apps assist in providing information and data regarding real-world environments. The resultant effects are the emergence of interactive hotel elements (Yung, Khoo-Lattimore, & Potter, 2021). For instance, the tourism sector uses beacon technology and augmented reality-powered tourist destinations applications to offer proper drive notifications in ideal situations.

In the travel industry, AR has further significance. AR enables businesses and hotels in the tourism sector to enhance the physical niches that business entities try to influence their clients to visit, namely hotel rooms and local sights. Since tourists need more information about a tourism destination before arriving, much research is done on travel trends. AR ensures that such information is availed to customers on a 24/7 basis (Weber-Sabil and Han, 2021). Besides, the consumer lifestyle has changed over the last decade, and most clients in the travel industry tend to use their smartphones often whenever travelling. The

smartphones have AR apps that serve the interest of such customers.

AR is a new development in the tourism sector. It attracts more and new uses every day. Some examples of AR in tourism include augmented tourist destinations and interactive hotel elements (Arif et al., 2020). For instance, apart from the hotel surroundings, most firms in the tourism sector have developed AR applications that permit tourists to improve the whole travelling experience and let travellers get the required data or info while moving (Buhalis and Karatay, 2022). AR-enhance app boosts tourists' destinations, tourist attraction sites and locations. The app enables users to identify historical landmarks or buildings by pointing at their smartphones to get more information regarding a place in real-time. The tool can provide instant information on a restaurant based on menus and customer reviews.

On the other hand, the interactive hotel elements are another development of AR in the tourism sector. Interactive hotel elements in hotels have improved the general experience of travellers. Customers can access more information on resorts, hotels and related businesses. For instance, a British resort called the Hub Hotel found in the Premier Inn made AR attuned to partitioning plans placed within guesthouse rooms (Wei, 2022). If customers observe the walls using tablets or smartphones, additional information is included in the procedures regarding local places that could interest them. Thus, AR offers travel solutions that help revolutionize the tourism sector. It is also among the leading technologies that power metaverse devices and enhance social interactions.

6.1.2 Virtual Reality Tourism Experiences

Virtual reality works jointly with the metaverse tourism concept. Nonetheless, virtual reality seems to possess the power to improve various activities or things to a different height via virtual reality tourism (VRT) (Um et al., 2022). In this case, VR appears or is used to replace the requirements of travel sectors or tourism or offer more experiences that augment the actual travelling and tourism experiences. For instance, virtual reality experience by A Virtual Honeymoon to London and Hawaii using 360 video technology gives guests a virtual recreation experience to some key insights (Kim, 2021). Atlantis Hotel in Dubai uses VR technology to allow users to check the hotels before arranging for actual booking. According to Caulfield (2021), the experience enables users to compare the hotel rooms via virtual reality headset.

In the tourism industry, virtual reality expeditions can offer experiences deemed realistic. That is, tourists or individuals tend to adore the exploration of tourist destinations, sites or attractions from wherever they are sitting. However, when taken to the next level, virtual reality tourist destinations or attractions can be used to host virtual business meetings, virtual entertainment events, or virtual concerts (Lee, 2022). For instance, virtual reality creates an interactive experience capable of recreating an actual world niche and offers tourists a clear view of what should be expected in case a tourist destination or attraction site is visited.

Virtual reality has added a new dimension to the tourism world. VR created various attractions, including virtual theme parks. This implies that metaverse tourism has taken off as it helped create attractions such as virtual zoos, museums, and theme parks (Buhalis & Karatay, 2022). As a result, virtual reality offers a realistic experience for tourists or travellers since such people enjoy a product which is next to what an actual world would offer.

Virtual reality tends to offer further benefits to tourism businesses. A case illustration is that a virtual theme park can hardly be a topic with stern safety restrictions. VR is neither bounded by strict and grave rules. On the other hand, tourist firms are not required to take care of any real wild or domestic animal in the case of a virtual zoo (Dewi and Darma, 2022). In virtual reality, the zoo animals mentioned could range from fictional creatures to extinct animals, or even live and dead animals.

Virtual reality has significantly transformed the hospitality and tourism metaverse. Tourism technology and metaverse tourism have played a significant role to help in

altering the association between customers and businesses. For example, VR, technology and metaverse tend to bridge the physical distances and provide tourists or travellers with the best and new experiences. Above all, the metaverse concept, as applied in the tourism industry, offers the best opportunities for inspiring clients and providing prized info and data, which are expected to boost bookings (Hsu et al., 2022). Nevertheless, despite the two technologies not being completely the same, virtual reality idea and metaverse work jointly. The opportunities created by metaverse tourism seem to be extensively focus on VR. Regardless, virtual reality impacts other areas, such as virtual booking interfaces and engines.

Virtual reality has continued to disrupt the tourism and hospitality industry. For instance, as a form of the metaverse, companies that adopt VR technology appear ahead or have a competitive marketing and business edge over other market rivals that have failed so far to embrace it. Tourist firms with online virtual reality tours enable their clients to experience outdoor tourist attractions, restaurant interiors, and hotel interiors, among others, from the comfort of their phones and homes (Han, Bergs, & Moorhouse, 2022). Besides, through VR, tourists can complete a booking and back out, a function enabled through virtual reality. That is, clients can now make bookings ahead of the travelling schedules. Hence, metaverse tourism has increased booking volume and enhanced the tourists' booking experience.

6.1.3 Redefined Guest Booking Experiences

Customer experience is considered central in the tourist, travel, and hospitality industry. However, with the advent of new metaverse technologies, including VR and AR, and the ever-widening selection of choices for travelers, the experience of clients is vital and should be enhanced. Metaverse has fine-tuned the experience of tourists by building trustworthy and recurrent clients boosting the business undertaken (Wei, 2022). An example is Thomas Cook Airlines that incorporated 360-degree virtual tour of the helicopter flights. With the experience of firsthand destination, the company increased its bookings by 180% (Lee, 2022). Additionally, Visit Wales, UK Company, used VR videos for kingfishers and dolphins to attract more clients. The end result was a 60% increase in bookings after the publish of VR videos (Kim, 2021). With the advent of the metaverse and its related technologies, tourists can book hotels, tourist destinations, and flights without necessarily dropping out at the booking stage or booking through word of mouth.

The tourism industry has adopted or integrated voice control and voice search considered constituents of a metaverse in the booking system. Home smart speakers have continuously become very popular. These, coupled with mobile assistants such as Bixby, Google Assistant, and Siri, have attracted the attention of tourism clients or travellers who have opted to voice search (Hsu et al., 2022). Currently, tourism companies deem it necessary to capture guests by incorporating content that emerges during voice search and enables tourism clients to make voice bookings.

Conversely, the metaverse has led to the invention of the winding tree booking. This booking system is a current supply and demand and open source marketplace tracking and booking system. Most airline firms working jointly with the tourism industry, namely Lufthansa and Air New Zealand, have the Winding Tree booking system (Dominguez-Noriega et al., 2011). The system enables tourists to make prior bookings. Blockchain booking is very transparent and offers traceability attributes to travelling customers who can track their baggage.

Metaverse tourism is a source of inspiration for tourists. The VR and AR concepts offer interactive real-world experiences to clients concerning their tourism destinations, what should be expected, properties available or offered, and the duration of the journey (Dewi and Darma, 2022). Tourists are inspired by the metaverse, which inspires them to finalize their purchase or booking.

Metaverse has led to increased booking volume. The value of metaverse tourism can be seen in its capacity to augment the general booking volumes. First, tourists gain inspiration from AR and VR, enabling them to make

restaurant selections and book hotels. The tools influence the purchasing decisions of tourists and travelling customers (Lee, 2020). Second, metaverse tourism enhances the customers' booking experience. The tool enhances the booking process as it offers valuable info, which can hardly be delivered differently. Most customers can now finish their bookings without backing out. For instance, tourist restaurants or hotels can use digital avatars or virtual reality tours to enable clients to walk around a facility to see the conditions of the rooms and what is offered (Suh, Kim, & Suh, 2011).

6.2 Planning for Tourism Activities, e.g. Sales and Marketing Campaigns

Metaverse has been extensively used to facilitate online expos and trade shows. In most instances, the expos, trade shows, and other identical activities were significantly influenced by Covid-19. Thus, metaverse serves as an online platform for tourist firms to market their services to customers. However, sales and marketing campaigns are prone to increased climate variation awareness, which similarly affects the hospitality industry (Buhalis & Karatay, 2022). Thus, metaverse tourism can offer a platform for facilitating online expos and trade shows. Metaverse tourism provides a better sense of immersion for marketers and planners. This platform allows marketing events or activities into a tourism firm's online sphere. Furthermore, social interaction can be promoted using virtual reality or avatars.

6.3 Smart Contracts and Cryptocurrencies

Most tourism firms tend to run client loyalty schemes. In most cases, such schemes are aimed at encouraging returning customers. In such instances, blockchain has been used in these programmes. The cryptocurrency helps simplify the process and allows clients to easily access data regarding the distributed tokens and loyalty points awarded. Besides, when carrying out regular bitcoin transactions, smart contracts are performed on the bitcoin blockchain (Lee, 2022). Thus, the tourism sector uses bitcoin technology in powering smart contracts using added layers like a lighting network. That is, smart contracts can be categorized under high-tech blockchain protocols, which mainly affect the TOC (terms of contract). These incorporate an additional layer during transactions or payments made in the tourism sector.

6.3.1 Ecotourism and Digital Detoxification

Through metaverse, customer experience can be greatly improved. Metaverse through VR and AR encourage the use of online platforms. The platforms are considered safe and minimize any toxicity. On the other hand, adopting the metaverse in the tourism sector reduces the chances of environmental pollution (Buhalis & Karatay, 2022). People across the globe can meet on the platform. The booking process is uninterrupted, and most activities in VR are virtual and cause less environmental pollution.

6.3.2 How Cryptocurrencies Support Tourism

Blockchain can be described as a list or catalogue of digital records or a public ledger. Through blockchains, the transactions can be documented permanently and incognito. In this case, the 'blocks' or digital records found in the tourism industry databases are usually safeguarded through cryptography (Guglielmo and Parlatore, n.d). As long as such data or info is documented in blockchain, it can hardly be modified or altered.

A blockchain is a form of cryptocurrency. In the hospitality industry, all information appears to be traceable and decentralized. As a result, the database can never be allowed to go off or be disconnected. Thus, the tourism sector can use cryptocurrencies such as blockchain to secure financial transactions (Kim, Lee, Hur and An, 2022). Besides, the technology can be used in making accurate simplified payments. This form of cryptocurrency can streamline the payments process and ensure transparency (Nicolaou and McKnight, 2006). For instance, most cryptocurrency applications in the tourism sector aim to make payments more secure (Han, Bergs, & Moorhouse, 2022). Be it just providing safe and transparent bank payments and global ledger or accepting cryptocurrencies such as Ethereum or Bitcoin; cryptocurrency can be used in streamlining payments or hotel costs in the tourism sector.

6.4 Decentralization and Traceability

Metaverse comes with a LockChain, a block-chain-powered technology that allows firms and hotels in the hospitality and tourism industry to rent properties to travellers, customers or travellers. LockChain appears as an all-in-one platform or digital interface that permits tourists and property managers to transact or make payments in a single place (Lee, 2022). In most cases, the booking process involves various mediators, but LockChain is a booking engine with decentralized operations, which eliminates intermediaries and operates on a zero per cent commission rule.

Notably, the decentralization of blockchain technology makes the information available and kept in a single safe place. The data becomes transparent to all in such a secured pack and cannot be manipulated. The network shares the various records and does not encounter vulnerability or experience any failure. There is hardly a single source of susceptibility or failure (Buhalis & Karatay, 2022). In addition, every single piece of data or information included in the blockchain appears to be time-stamped. The timely stamping warrants that every data entry is traceable. The act furthermore enhances the transparency of the databank itself.

6.5 Metaverse Technologies and Their Impacts on the Tourism Sector

Metaverse tourism will function with a combination of several cutting-edge technologies that will also impact the future of the tourism industry. The metaverse has consistently brought next-generation technologies and trends that affect tourism's metaverse theme.

6.5.1 Internet of Things (IoT)

IoT technology connects electronic devices via gadgets and sensors. Metaverse IoT programs distribute the collected data from the physical world, thus creating an accurate representation of objects (Bulchand-Gidumal, 2020). As a result of greater customer experience, more personalization, and automation, the tourism sector is well-placed to reap the rewards of IoT. There is an optimization of accommodation services and a reduction in energy costs. IoT technology can be applied in the tourism industry to raise alert on anxiety levels during traveling. It also enables greater control and information accessibility with mobile devices. There is increased personalization. Guests can control services through centralized devices within the tourism industry (Revfine.com, n.d). Internet-enabled television, lighting, and heating are automatically controlled, thus regulating seat temperature and air conditioning in the travel industry.

IoT Tensures seamless travel as customer experiences are streamlined in all areas of the travel industry (The Metaverse, 2022). Sensors send information about the guests' baggage when traveling, allowing faster location of such items. Guests also seamlessly check-in at hotels by sending digital key cards, thus eliminating front desk stopovers. Despite the enabled personalization, IoT travel technology provides financial advantages through smart energy saving (Wei, 2022). For instance, internet-enabled devices can continually adjust the temperature to room temperature. The technology is also applied in lighting as hotel sensors detect the room's light levels, thereby reducing power consumption by the bulbs. High-powered lighting is only used when there are low light levels. Integration of beacon technologies and smartphone capabilities, travel companies can locate user information and location-specific details (Revfine.com, n.d). This leads to real-time user engagement and sending information about the attractions and the nearby hotel facilities and transport services. Ultimately, IoT applications in tourism will continue to evolve, amounting to internet connectivity to appliances and devices. This will optimize internal processes, deliver superior guest experiences, and effective communication within the tourism industry.

6.5.2 Ambient Intelligence (Artificial Intelligence, AI)

The technology relies on processing algorithms, capacities, and big data. Currently, AI programs are tested and developed in the tourism sector. Ambient intelligence is a subfield of artificial intelligence that hotel rooms have adapted to increase the sensitivity of the accommodation facilities by responding to the customers' needs and actions, including light, music, and temperature (Bulchand-Gidumal,

2020). Ambient intelligence allows for autonomous sensitivity regarding the users' desires and adapting. Artificial intelligence will enable matching users' needs to the environment. The technology will also allow pattern recognition based on crowdsourced data, which acts as guidance to tourists. The guaranteed faster response rate will also improve customer relationship management in tourism.

According to Bulchand-Gidumal (2020), facial recognition and natural language processing are also aspects of artificial intelligence in which computers naturally process language. In natural language processing (NLP), text input will be done via voice or text. NLP will allow automated translation of languages by the IT systems through conversational systems and virtual travel assistants (Lee, 2022). The language translation applications will help in the development of simultaneous translation systems. NLP will facilitate guests' navigation and travel to new places as it will solve the anxiety and discomfort of language barriers. In metaverse tourism, face recognition will be used to recognize tourists in digital video or images. Its ability not only to count a single individual but to recognize several people will enable the monitoring of tourists' experiences (i.e., guests' happiness after the breakfast buffet) (Wei, 2022). In this regard, metaverse tourism will allow the tourism industry to set metrics and meet the tourists' desires and needs, turning into delightful user experiences, thus improving the tourism sector. There will be better decision-making with greater mobility which will influence guests to have a more social perspective.

6.5.3 Neural Networks, Deep Learning, and Machine Learning

Deep learning and machine learning are components of AI; deep learning has more specificity to machine learning. Machine learning is a set of algorithmic notations that repeat, obtain feedback and learn the previous operations (Bulchand-Gidumal, 2020). At the same time, deep learning is a technique through which computers are given a set of algorithms and evaluate the rules based on increasing accuracy. Machine learning and deep learning can be applied to the tourism industry to prevent fraud, forecasting and weather prediction, and sentiment analysis. Similarly, neural networks can be used for deep and machine learning in predicting and imitating human neurons through artificial neural networks (ANN) (Revfine.com, n.d). Neural networks can be used to forecast and estimate current trends and future events based on contextual and historical data. With the forecasting, the tourism sector will best understand guests' demands, formulating the most-effective marketing techniques with proper resource allocation and financial management (Revfine.com, n.d). This is a bright future for the tourism sector.

6.5.4 Non Fungible Tokens (NFTs)

NFTs are non-fungible tokens used in the metaverse for the representation of digital assets, including painting, digital art, and posts. NFT can be used to tokenize buildings, and other touristic destinations. For instance is the latest album, When You See Yourself, by Kings of Leon Show, which was one of the first collections of NFTs release record, earning over $2 million in sales (Allie, 2022). The 'Golden Tickets' helped tokenize the exclusive artwork. As a blockchain technology, NFTs can be used to trade digital assets alongside AR and VR technologies, hence regulating the whole tourism space. Metaverse-based NFT tourism allows the guests to explore the destinations, having a closer look at the arts and attractions of their choice (The Metaverse, 2022). The viability of NFTs and its tokenization of assets has combined with metaverse tourism to power interoperable blockchain experiences.

NFT ticketing technology can be used in metaverse tourism to distribute tickets to tourists. There is increased transparency and a fair tourism economy with NFTs. The technology eliminates intermediaries and allows smart contracts and negotiations among tourism parties. For instance, NFT provided fraud-free digital provenance for the Yao Family Wines (Allie, 2022). The high-end winery auctioned its wine alongside a limited-edition NFT, which offered a digital investment opportunity and reduced the risk of fraud as the transactions were all traceable with clarity

to those who needed to sell, invest or buy (Allie, 2022). NFTs redefine social experiences as guests and tourism organizations can hold unique NFT avatars to prove their services and terms. Discussion of the perspectives regarding the tour experiences can also be attained, thus engaging guests positively to solve any underlying concerns. The excitement of NFTs s truly to create value in metaverse tourism and build trust in virtual tourism. This will positively impact and revolutionize tourism in the future.

7 Conclusion

The expansion of blockchain technology has led to many changes in the tourism sector. Blockchain technology has led to more positive than negative effects on tourism. A world beyond the physical universe, the metaverse, has created VR and AR that would rebuild the tourism industry and transform the destination experiences into virtual tours. The advent of technology has created a purposeful image of reality in the tourists' minds, thus creating more believable experiences than reality. With this, audiences are now accepting the experiences more than before, leading to schemata accumulations. Virtual tours are linked to be the perfection of real-world experiences without changing the physical destinations. Its integration with ambient intelligence, IoT, NFTs, machine and deep learning is considered the greatest future development of the tourism industry. This is because there will be real-time user engagement, improved communication, forecasting and sentiment analysis and tokenizing of assets and resources to reduce fraud. This critical ability, metaverse tourism, should be undoubtedly called a revolution in the tourism industry.

Having been accepted by the tourism businesses and the clients, metaverse will continue to attract the shareholders' interests. This will lead to the exponential growth of metaverse tourism. Tourism industry players have recognized this new technology and will leverage the opportunity for sustainable competitive advantage. Metaverse tourism may not replace physical tourism experiences with virtual tourism experiences, but it will modify the consumption patterns of tourism services and products. It will positively influence consumers' travel decisions by creating VR, AR, IoT and AI experiences. Metaverse will also lead to the effective planning of tourism activities. Metaverse features like; digital detoxification, smart contracts, decentralization and traceability will help eliminate intermediaries and corruption. This will create trusted systems and stimulate equality between big and small entities. Indeed, adopting metaverse technology will increase the service quality within the tourism industry. This will lead to sustainability and benefit all stakeholders. In reality, the metaverse will positively transform the tourism industry in the future.

Nevertheless, the literature analysis revealed that despite the numerous advantages of blockchain technology, there are some disadvantages. These include intrusion from hackers, false information from tourists and lack of technological awareness from stakeholders in the industry. The previously suggested solutions include the development of flawless smart contract code, cryptocurrency payments, and Eges novel protocol to hide member nodes from DoS attacks. Besides, integrating IoT and iterative bilevel hybrid intelligence models would reduce errors arising from mistaken descriptions of physical resources. This will increase the sustainability of metaverse tourism in the future.

7.1 Research Limitations

Due to the youngness of the technology, there are limited scholarly materials that deal with the impacts of metaverse technology in tourism. Therefore, the research was based on limited practical and theoretical issues. However, this research contributes to necessary steps in raising awareness, opening up a wider debate and understanding this new phenomenon for further research.

7.2 Research Implications

The research's practice, theory and policy are essential to the tourism industry. The study provides important information on the adoption and barriers to blockchain technology. The presented solutions are also crucial to the industry. The presented models would reduce confusion during blockchain adoption.

7.3 Future Research Direction

Having identified the positive impacts of metaverse tourism which include; quality products and services, data protection, perfecting consumers' attitudes, and equality systems, future research should focus on blockchain challenges and discuss their reflections on the tourism industry.

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