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Immersive Technologies as Promotion Tools for Tourism

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Abstract

A comprehensive search of Scopus databases was conducted, including articles published between January 2019 and December 2024. To improve the review reports, the guidelines for systematized review report elements were used under the ReSiste-SHC framework, 26 articles met the inclusion criteria and were classified according to the purpose of the study: To address the aspects that cover the use of immersive technologies such as virtual and augmented reality in tourism according to the research of the last 5 years. We were able to identify 7 aspects that play a fundamental role in tourism through immersive technologies, which were enrichment of the tourism experience, promotion, virtual exploration, inclusive tourism, augmented reality (AR) applied to heritage, barriers and challenges, and training for tourism professionals.

Keywords: *Media Convergence Era, Broadcasters and Presenters, Dilemmas and Opportunities, Radio and Television, Digital Technology.*

Introduction

The use of emerging technologies such as virtual reality (VR) in the tourism sector has seen significant growth in recent years. Although widespread adoption is still in its early stages, technological innovations are transforming the way tourists plan, experience and remember their trips, extending their reach both to a community limited by physical or economic conditions, and to destinations that are not fully accessible due to various conditions. On the other hand, seen from a business approach, companies in the hotel and tourism sector face a scenario with highly competitive destinations thanks to the post-pandemic resurgence, and therefore have seen the need to resort to the use of artificial intelligence in order to improve their operations and differentiate themselves in the market (Stergiou & Nella, 2024).

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VR has shown great potential to improve accessibility in tourism, especially for people with disabilities. Some studies indicate that VR can facilitate remote exploration of tourist destinations, offering immersive experiences without the need to physically travel. This is particularly useful for people with reduced mobility or sensory disabilities, who can benefit from experiences that simulate the tourist environment in a way adapted to their needs. Some research has analyzed the design of accessible tourism platforms based on VR, allowing users to experience destinations such as museums, historical monuments, natural parks, among others, without physical barriers, through remote but realistic experiences.

In recent years, research has been carried out related to the application of virtual reality as a tool for the evolution of tourism; (Pantelidis et al., 2024) developed research with the purpose of studying to what extent and how fully immersive virtual reality experiences can increase tourists' attachment to rural destinations from the perspective of place attachment theory. The results allowed them to incorporate new variables that positively increase place attachment, reaffirming tourist loyalty, and they verified that virtual reality generates experiences capable of improving the promotion and competitiveness of destinations. (Cranmer et al., 2020) explored the perceived value of AR in tourism through experts in the sector, who highlighted that the value is found in its impact in areas such as marketing, knowledge, economics, tourism and organization, and observed that one of the most valued aspects of AR in the current tourism industry is its potential in the field of marketing.

Some authors maintain that for virtual tourism to be successful, a lot will depend on how tolerant users are to the technology required by the use of emerging technologies such as augmented reality or virtual reality. (Iftikhar et al., 2023) focused their study on the acceptance of VR by tourists with disabilities, based on three theories: the theory of planned behavior, the TAM theory (Technology Acceptance Model) and the theory of leisure limitations. During the study they identified specific factors that influence the engagement and acceptance of VR, such as emotional and cognitive factors, and leisure limitations for people with disabilities, which allowed them to propose a conceptual model relating all the identified elements. (Li-Keng & Hsien-Long, 2022) proposed an integrated framework and structural model based on the pleasure-arousal-mastery model to investigate how atmospheric and affective factors influence continuous use intention and word-of-mouth communication in virtual tourism, demonstrating that both are affected by telepresence and intensity are related to the pleasure experienced in virtual tourism and focusing on it can ensure a positive experience.

(Loureiro et al., 2020) with the purpose of offering an overview of the tourism research network related to VR and AR, they analyzed its evolution over time, highlighting the most relevant themes and studies that emerge from the literature. After completing their research, they highlighted that these technologies are advancing and generating important opportunities for the tourism sector and that they have been used in various areas such as planning, management, promotion, education, as well as in the creation or transformation of tourist experiences. For their part, (Fan et al., 2022) argued that AR/VR tourism studies have not clarified how certain parallel structural constructs affect customer responses. Through a meta-analysis, they concluded that AR/VR applications in tourism must integrate key attributes to increase perceived value, especially regarding presence, attention, and motivation consistency. Their results showed that presence positively impacts the tourist experience, by influencing the perception of value and the mediators of the psychological response. Furthermore, the psychological response improves behavioral intention, behavior and attachment to virtual tourism.

This study aims to address the various aspects of how virtual reality (VR) can influence the accessibility and promotion of tourism, through different studies carried out over the last 5 years. To comply with the objectivity and rigor of the systematized review, as a self-contained review, the research questions and objectives described in the following lines were defined.

Research Questions

P1. What aspects do the use of immersive technologies such as virtual and augmented reality cover in the tourism sector according to research from the last 5 years?

P2. How do these aspects influence improving the tourism industry?

These questions can serve as a basis for exploring how virtual reality covers various technical, social, economic and ethical aspects related to the use of this technology in a sector as vital as tourism.

General Objective

O1. Identify the aspects covered by the use of immersive technologies such as virtual and augmented reality in the tourism field according to research from the last 5 years.

O2. Describe the influence of these aspects on the improvement in the tourism industry.

Literature Review

Immersive Technologies in Tourism

A virtual environment is software that creates and simulates a digital three-dimensional space. Examples of this are immersive technologies including Virtual Reality (VR) and Augmented Reality (AR) (De Paolis et al., 2022; Purwanto et al., 2024). VR is characterized as a three-dimensional experience where the user enters a virtual environment and is visually separated from the real world through the use of devices such as head-mounted displays (Iftikhar et al., 2023). In this sense, VR redefines the perception of experience and space, both real and imaginary, using specific tools and artificial intelligence (Peruzzini et al., 2023), thus it has the potential to transform the conception of time and space through familiarity with digital environments, where users can simulate real-life scenarios, interact with objects and experience a sense of presence in a virtual world (Sousa et al., 2024).

AR is a technological tool that enables an experience between virtual and tangible spaces, merging through technological devices such as virtual lenses, webcams, mobile devices or tablets (Murcia Rodríguez & López Martínez, 2024). This technology has three main characteristics: it integrates real and virtual content, allows real-time interaction with the user and displays virtual objects in a three-dimensional context within the real world (Hsu et al., 2024), these objects are built through computer productions that are developed by receiving and processing information from the user through input sensors, such as voice, video, graphic images or data from the Global Positioning System (GPS) (Shafiee Roodposhti & Esmaeelbeigi, 2024). Thanks to these characteristics, AR has been highly valued for its ability to generate richer and more immersive content, which improves interaction with and perception of the environment (Cranmer et al., 2020).

On the other hand, the term "metaverse", which merges "meta" (beyond) with "universe" (physical world), refers to a three-dimensional virtual world, an advance over "virtual reality." It was introduced by Neal Stephenson in his novel Snow Crash (1992). The metaverse describes

a parallel reality composed of digital objects, virtual goods and avatars, where remote users can interact without physical barriers. It integrates emerging technologies such as digital twins, virtual reality (VR), augmented reality (AR), high-speed Internet, wearable sensors, artificial intelligence (AI) and blockchain (decentralized and secure digital record technology that allows information to be stored in interconnected blocks in a transparent and immutable manner through a cryptographic code) (Shin & Kang, 2024; Yoon & Nam, 2024).

The particularities of the tourism sector make it an ideal field for the implementation of immersive technologies such as virtual and augmented reality, considering that they can enrich tourist experiences (Sousa et al., 2024). These technologies are one of the most important tools for the development of smart tourist destinations based on innovation, advanced technology, sustainable development, accessibility, tourist interaction and integration with the environment and the improvement of quality in the field of tourism, giving way to "second chance" tourism (Fernández García et al., 2024; Liu et al., 2024). This is why virtual tourism has been recognized as an effective tool to increase the competitiveness of destinations, and also offers numerous opportunities for both tourism researchers and professionals in areas such as planning and management, marketing, entertainment, education, accessibility and heritage conservation (B. Liu et al., 2024). In this sense, its usefulness stands out for the practice of responsible tourism in vulnerable destinations with accessible alternative experiences that mitigate the negative effects, ensuring its conservation and avoiding the risk of deterioration, allowing future generations to enjoy it and live in a unique way. In addition, it implements new communication and marketing tools that increase the value prior to the experience and generate interest in visiting the destination (Trunfio et al., 2022; Shafiee Roodposhti & Esmaeelbeigi, 2024).

Likewise, immersive technologies help overcome distance barriers by offering information and improving understanding of a destination before the actual visit. In addition, it provides an educational, entertaining and aesthetic experience, allowing users to fully immerse themselves in a virtual environment. VR creates a sense of "presence", making users feel as if they are actually in an alternative world, which can be compared to the experience of traveling to a physical tourist destination. This technology allows users to block out real-world information and feel completely immersed in an alternative digital environment (Lee et al., 2020; Aldossary & McLean, 2022). Nowadays, virtual reality travel has been widely used in various attractions and destinations, such as space travel, excursions to fantastic worlds, visits to theme parks, and sporting events (B. Liu et al., 2024).

Methodology of the Systematized Review

Systematic reviews focus on one or several specific questions that are asked before beginning the review and answered in a structured way (Reyes B., 2020). In this sense, they use a rigorous methodology to identify and select the majority of relevant studies published on a specific topic, critically evaluate them, extract and synthesize the results, and, when possible, combine the data statistically to carry out a meta-analysis (Khan et al., 2022). Meanwhile, systematized reviews or systematic approach offer a rigorous and methodical approach (hence their name) to carry out bibliographic reviews, which are (or should be) an essential stage in all new academic research, and are applied in various areas, especially in the Human and Social Sciences (Codina, 2018, 2020). The systematization of a review is achieved through the application of a protocol that guarantees transparency, rigor and traceability in the different stages of the review development process (Codina, 2020a).

The present study applied the methodology based on a systematized review Framework ReSiste-CHS Systematized Reviews in Human and Social Sciences, proposed by (Codina, 2020b), consists of 4 main phases: search, evaluation, analysis and synthesis, based on the SALSA Framework (See Figure 01). This methodology has been applied by various authors in recent years and in different fields, (Vega Rojas et al., 2024) and (Caamal et al., 2023).

Phase I. Search

The search phase provides the first set of elements that will be considered to integrate the document bank, also known as the evidence base due to its crucial role in the preparation of the final synthesis. To guarantee the effectiveness of this element, this phase includes the FDC Framework: facet the research, derive and combine the keywords to arrive at the search equation (Codina, 2020c).

Facet	**Keywords**
Study Object	Virtual reality, tourism
Action Type	Analysis, synthesis, evaluation, comparison
Theoretical Framework	Virtual reality, tourism promotion, emerging technologies, tourism promotion.
Data Obtaining Techniques	Case studies, systematic reviews, comparative analyzes
Methodological Strategies	Qualitative, conceptual, descriptive

Table 1. Facet Matrix / Keywords of Virtual Reality and Accessible Tourism

Source: Own Elaboration Based On The Scheme Of (Codina, 2020c)

The selected keywords were: virtual reality, emerging technologies, accessible tourism, tourism accessibility, virtual tourism, tourism promotion grouped with logical AND and OR connectors; However, the resulting equation was considered in English, since only the Science Direct - Scopus database was considered:

(virtual reality OR inmersive technologies) AND (tourism) AND (accesibility) AND (promotion)

Phase II. Assessment

The evaluation phase has the task of verifying that the documents obtained are suitable to be integrated into the final document bank, applying additional inclusion and exclusion criteria, verifying that they meet the minimum quality requirements established by the objectives of the review since it will be the collection that will go through the analysis stage.

Inclusion criteria

The following parameters are considered as inclusion results: publication period: January 2019 – forward (CI01), studies in English (CI02), articles (CI03), Studies included in areas of social sciences and humanities and environmental (CI04), studies that adapt to the IMRyD structure Introduction, Methodology, Results and Discussion or conclusions (CI05).

Exclusion criteria

Minimum two keywords in the study (CE01), studies that are not related to tourism (CE02)

Procedure

The search was carried out in the Science Direct – Scopus databases with the equation presented in English; The search results returned a total of 1024 articles. After applying the inclusion criteria CI01, CI02, CI032 and CI04, 641 studies that did not meet the criteria were excluded, leaving 383 studies to be filtered by the exclusion criteria. After applying the CE01 and CE02 criteria, 286 studies were discarded and the sample was reduced to 97 potentially relevant studies. After reading the summary, 33 studies that did not fit the purpose of the research were excluded. Finally, of the 64 articles that went to full text reading and CI05, 38 were excluded and a total of 26 studies in the systematic review.

Phase III. Analysis

The objective of this phase is to carry out an analysis of the set of documents obtained, ensuring that each article or report has been evaluated according to the same criteria, which are aligned with the objectives of the review. The procedure for this phase consists of determining and applying the analysis scheme to each and every one of the articles included in the document bank. Ensuring the rigor of the phase, both comparison and constant review of the articles are recommended, since changes may arise in some aspect of the scheme (Codina, 2020d).

Reference	
Title	
Author	
Year	
Publication	
URL	
Keywords	
Structure	
Aim	
Methodology	
Most significant results	
Theoretical contributions in tourism	

Table 2. Analysis Scheme of Articles Included in the Review

Results

Phase IV. Synthesis

The purpose of the synthesis phase is to generate an innovative and unique result, which goes beyond the simple combination of its elements. Ideally, the synthesis should constitute a section with high added value, the result of an intellectual effort in three directions: adding, integrating and interpreting (Codina, 2020d). To proceed with the synthesis and results phase, each of the questions posed within the framework of the research will be answered in each of the sections below.

Aspects that cover the use of immersive technologies such as virtual and augmented reality in the tourism field according to research from the last 5 years.

The use of immersive technologies in the field of tourism has grown considerably in recent years, offering new ways to interact with destinations, services and tourist experiences. This phenomenon has generated a series of debates and studies among various authors, who address different key aspects of how these technologies impact the tourism industry. The most prominent topics in the articles analyzed include the enrichment of the tourist experience, promotion, virtual exploration, inclusive tourism, augmented reality (AR) applied to heritage, barriers and challenges, and training for tourism professionals.

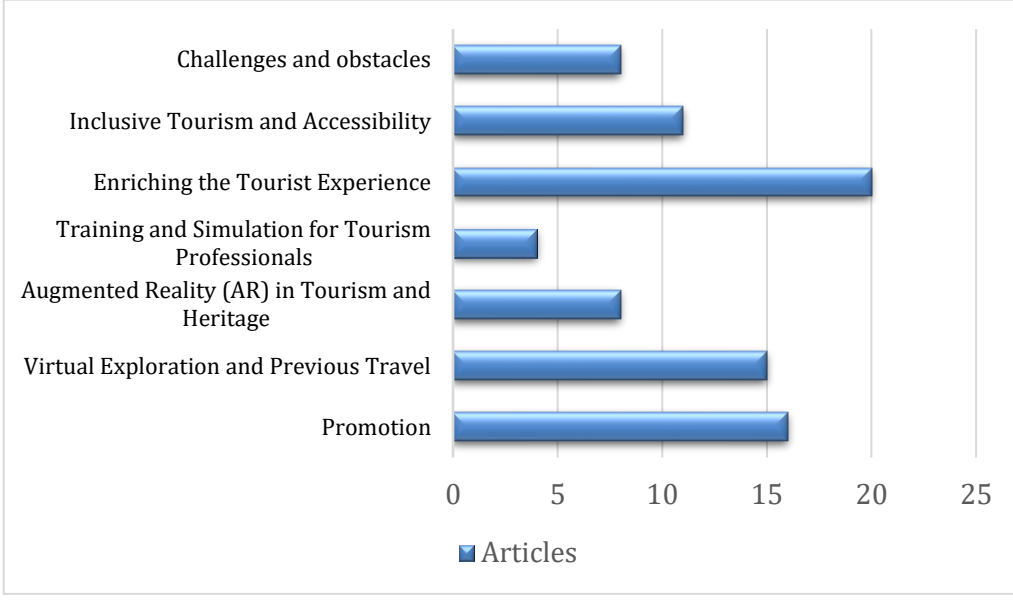

Figure 1. Aspects of the Tourism Sector That Cover the Use of Emerging Technologies

In Figure 1, it can be seen that the most prominent aspects in the research analyzed are the enrichment of the tourist experience, tourism promotion and virtual and pre-trip exploration, addressed in 20, 16 and 15 articles respectively, followed by tourism promotion. The authors indicate that these aspects are key where immersive technologies play a fundamental role, since they influence the consumer's purchasing decision. Meanwhile, aspects such as training and simulation for tourism professionals through immersive technologies is an area that is still developing, only 3 of the studies addressed the topic. In figure 02 it can be seen that the interest in investigating immersive technologies stands out in the years 2020, probably as a result of the

Covid-19 pandemic, and 2024, which demonstrates that they are positioning themselves solidly in the tourism industry.

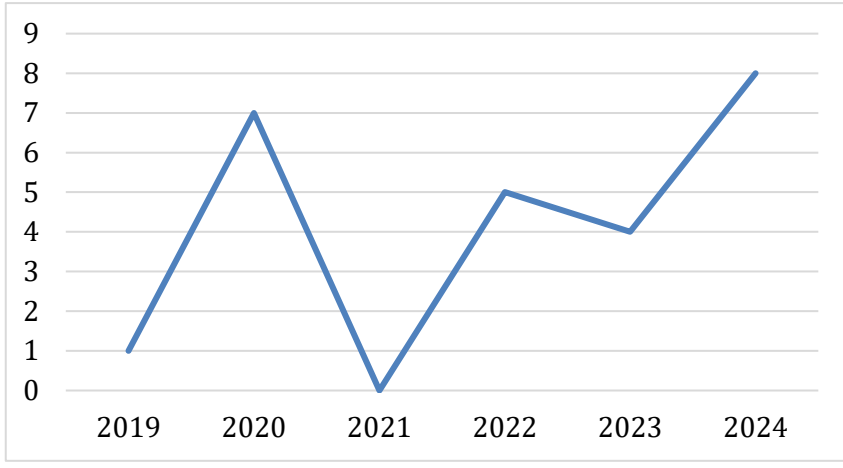

Figure 2. Ranking of Articles by Year According to the Document Bank

Enrichment of the Tourist Experience

The results demonstrate that the included articles highlight how immersive technologies, particularly virtual reality (VR) and augmented reality (AR), are transforming the tourist experience by enriching visitors' interaction with destinations, improving their accessibility, emotions and memories. Authors agree that one of the main advantages mentioned is the ability to offer highly immersive experiences, which allow tourists to not only explore a place virtually, but also interact with it, which increases their enjoyment and sense of presence (Pantelidis et al., 2024; C. Liu & Huang, 2023). This immersion contributes to creating a feeling of "virtual authenticity", where users feel that they are truly present in the destination, making users feel more connected and engaged with the virtual environment, which enriches their feeling of being present in that space. (Yin et al., 2024; M. Lee et al., 2020; Yoon & Nam, 2024). Results from other authors highlight how VR and AR not only improve visual perception, but can also integrate other senses, such as smell and sound, to create more complete multisensory experiences (Peruzzini et al., 2023; Zhang et al., 2024). These technologies allow visitors to feel a deeper emotional connection with places and objects, promoting learning, information retention and emotional attachment to tourist and cultural destinations, as in the case of museums, where these technologies help bridge the gap between authenticity and education, allowing visitors to interact with artifacts in an enriching way (Serravalle et al., 2019; Fan et al., 2022; Li-Keng & Hsien-Long, 2022;

Another common point in the research is the recognition that virtual reality not only complements the physical visit, but can replace it, especially when it comes to destinations that are difficult to access or in situations where travel is impossible, as in the case of the virtual reconstruction of historical or heritage and even environmental sites (Allal-Chérif, 2022; Sousa et al., 2024; De Paolis et al., 2022). Likewise, the improved accessibility that these technologies offer for groups of tourists with disabilities stands out; it not only expands tourism opportunities, but also generates emotional and health benefits, by allowing them to live experiences similar to those of other tourists (Iftikhar et al., 2023). VR also offers the possibility of revisiting past experiences or taking deeper and more detailed tours that the limited time of a conventional visit

does not allow, reliving the experiences lived, enriching both the decision-making process and the experience itself (Franczuk et al., 2022; Shafiee Roodposhti & Esmaeelbeigi, 2024). In this sense, the authors highlight the potential of these technologies to enrich educational and cultural tourism through "edutainment", fusing learning with fun and encouraging the active participation of users, which improves the visitor experience and the preservation of cultural heritage (Innocente et al., 2023; Trunfio et al., 2022; Rahimizhian et al., 2020)

Tourism Promotion

Secondly, we find tourism promotion, another key aspect where immersive technologies play a key role, since by offering immersive experiences, they allow tourists to explore destinations interactively before visiting them, reducing uncertainty and improving decision making (Lee et al., 2020; M. Lee et al., 2020; Yin et al., 2024). The authors agree that VR, for example, offers a richer and more realistic vision of destinations, which allows tourists to visualize their future trips in a more precise and attractive way, reducing the perceived risk when dealing with intangible products. In this sense, they point out that marketing experts should promote virtual reality as a tool that facilitates obtaining tourist information more quickly and optimizes the decision-making process, which generates a positive impact on the purchase intention of the product. .(Vishwakarma et al., 2020; Yoon & Nam, 2024; Peruzzini et al., 2023).

(Lee et al., 2020) and (C. Liu & Huang, 2023), focused on cultural tourism, found that VR allows the creation of personalized and reflective experiences about heritage, which even promotes its preservation, and at the same time it is considered a valuable tool in the marketing of tourist destinations, by offering quality virtual experiences that stimulate visits to real destinations. Other results show that the interactivity of these technologies not only improves the user experience, but also fosters loyalty to destinations, since tourists feel more committed and emotionally connected, favoring commercialization and competitiveness (Pantelidis et al., 2024; Trunfio et al., 2022; Sousa et al., 2024). (Shin & Kang, 2024 provide a focus on metaverse travel platforms, suggesting that they should be designed to offer a complete and multifaceted experience (functional, social, hedonic and sensory), which implies greater immersion and commitment on the part of virtual travelers.

On the other hand, immersive technologies are also being used strategically to segment and attract different types of tourists. For example, findings by (Rahimizhian et al., 2020; Shafiee Roodposhti & Esmaeelbeigi, 2024) revealed that AR and VR can target younger and technologically inclined groups, who are more receptive to these media and are attracted to the novelty of virtual experiences. Adding to the above, the combination of immersive experiences with digital and omnichannel marketing offers tourists a fluid journey that ranges from promotion to purchase decision, which reinforces the intention to visit the destination (Fan et al., 2022; Zhang et al., 2024). Virtual experiences not only serve as a tool to increase interest, but also encourage travel intent and, in many cases, drive word-of-mouth promotion as visitors enjoy sharing these engaging experiences with their networks (Serravalle et al., 2019).

Virtual and Pre-Trip Exploration

Virtual pre-trip exploration has gained relevance as an effective tool in tourism, allowing travelers to experience destinations and activities before their physical visit. Various studies highlight how VR and AR provide additional information that improves the travel experience, and in turn, allows potential tourists to explore destinations, hotels, attractions and activities before making a purchase or planning a trip (Fan et al., 2022). Authors such as (Iftikhar et al.,

2023) and (Vishwakarma et al., 2020) emphasize that these technologies allow tourists to explore virtual attractions such as roller coasters or aerial rides, which facilitates decision-making by providing a "test" prior to the trip. This type of exploration reduces perceived risk and generates a feeling of familiarity with the destinations, which improves visit intention. Platforms such as Google Earth VR and specific travel agency tools allow users to immerse themselves in a 360-degree virtual environment, helping them decide if they want to visit a specific place. Travel agencies and tourist destinations are using VR to offer immersive experiences through virtual visits to monuments, museums or entire cities, driving the desire to consume (Zhang et al., 2024).

Various authors argue that VR not only serves to experience a destination in a sensory way, but also as a powerful promotional tool, capable of motivating tourists to make more informed decisions and improve sales conversion (Leung et al., 2020; M. Lee et al., 2020; Peruzzini et al., 2023). Currently, tourists are more committed than ever to the use of virtual and augmented reality to explore destinations, hotels or museums before deciding to travel to the place (Loureiro et al., 2020). Likewise, the use of metaverse platforms, as exemplified in (Yoon & Nam, 2024)'s study on the ZEPETO application, facilitates social and cultural interaction, allowing travelers to connect emotionally with destinations before traveling.

Finally, studies also suggest that VR and AR not only improve tourists' decision-making, but also positively impact visit intention. According to (Sousa et al., 2024) and (C. Liu & Huang, 2023), the feeling of presence generated by VR makes tourists perceive the virtual experience as a realistic representation of what they will experience at the destination, which increases their satisfaction and the probability of recommending the destination. This phenomenon, called “know before you go,” not only allows tourists to experience diverse destinations from the comfort of their homes, but also reduces travel-related anxieties and facilitates itinerary planning (Lee et al., 2020; Rahimizhian et al., 2020; Shafiee Roodposhti & Esmaeelbeigi, 2024). (Li-Keng & Hsien-Long, 2022) adds that this requires a ubiquitous network, with a free exchange of information and the creation of a common online environment that generate greater comfort and efficiency, improving virtual tourism thanks to the constant availability of information. In this way, virtual exploration is positioned as a strategic tool in promotion and decision-making in the tourism sector.

Inclusive Tourism and Accessibility

Virtual tourism represents a significantly lower outlay for the consumer than conventional tourism; through the use of VR, it is even more pleasant than conventional tourism. Some museums and historical monuments have launched VR versions of their exhibitions so that people with limited mobility can enjoy virtual visits from home, such is the case of some places in Switzerland and renowned museums such as the Louvre Museum, the British Museum and the Museum of Modern Art (Li-Keng & Hsien-Long, 2022)

It is proven that VR has enormous potential to make tourism more accessible to people with disabilities or reduced mobility. The ability to virtually visit destinations and tourist attractions that would otherwise be inaccessible to some people can expand their access to cultural, historical and natural experiences. The studies reviewed explore various aspects of virtual reality (VR) in tourism, with a particular emphasis on accessibility, inclusion of people with disabilities, and heritage sustainability. (Iftikhar et al., 2023) propose a conceptual model that integrates theories such as planned behavior and technology acceptance, highlighting that intrapersonal, interpersonal and structural restrictions influence the acceptance of VR by people with

disabilities for tourist activities. This model highlights the importance of factors such as ease of use and perceived usefulness, essential to foster commitment to virtual tourism.

In a similar vein, (Pantelidis et al., 2024) demonstrate the emotional impact of VR on tourists' attachment to a destination, highlighting accessibility as a key element to allow tourists to experience a destination virtually, overcoming physical limitations. This accessibility is seen as fundamental in both traditional and virtual tourism, as reflected in studies such as that of (Loureiro et al., 2020), who point out that people with mobility disabilities can greatly benefit from VR experiences, since they allow them to overcome physical barriers and generate positive emotions similar to those of a real tourist experience.

Heritage preservation is also a prominent concern, as highlighted by (Li-Keng & Hsien-Long, 2022), who point out that VR offers great potential to protect cultural sites, by relieving pressure on popular destinations and offering immersive experiences in places that are difficult to access, which is why virtual tourism becomes alternative tourism (C. Liu & Huang, 2023). Similarly, (Innocente et al., 2023) and (Shafiee Roodposhti & Esmaeelbeigi, 2024) advocate user-centered design for the development of VR applications, highlighting the importance of considering the needs of users with disabilities from the initial design phases. This is exemplified by the creation of VR experiences that allow virtual visits to heritage sites, such as the case of Cancho Roano, where wheelchair users can experience the place without the physical limitations of the environment. Another example is AR and VR experiments to preserve and offer virtual tours as an alternative or complement to real cathedrals that are inaccessible or under restoration, such as the Notre-Dame cathedral in Paris (Allal-Chérif, 2022).

On the other hand, accessibility is also key in museums and other cultural spaces. (Lee et al., 2020) and (De Paolis et al., 2022) explore how VR allows visitors to access inaccessible objects and sites, enhancing the museum experience. Technology also facilitates the preservation and contextualization of artifacts, as evidenced in the Ostuni Museum, where VR connects artifacts to their original location, offering a richer and more accessible experience. Finally, technologies like the metaverse, described by (Yoon & Nam, 2024), integrate virtual information with the real world, improving accessibility and immersion, although they emphasize the importance of maintaining a constant connection with reality to prevent it from being perceived as an experience separate from the real world. Furthermore, these technologies are presented as key tools for ecotourism, allowing tourists to explore destinations remotely and sustainably, without negatively impacting natural environments.

Together, these studies highlight how VR and augmented reality can transform the tourism experience, not only improving accessibility for people with disabilities, but also contributing to the sustainability and preservation of cultural heritage, while exploring new forms of emotional and physical connection with tourist destinations.

Augmented Reality (AR) in Tourism

Studies on augmented reality (AR) and its impact on tourism and cultural heritage highlight a number of benefits related to user experience, accessibility and improved education and interaction. According to (Loureiro et al., 2020), the ability of AR to merge the physical and virtual world is essential to improve the experience of visitors in cultural and tourist sites. Apps like Google Lens the Layar offer interactive experiences that enhance destination exploration. Additionally, many museums and archaeological sites are implementing AR to enrich the

experience, displaying additional content such as historical reconstructions or interactive elements.

According to (Innocente et al., 2023), AR stimulates the senses in a more natural and vivid way, allowing visitors to deepen their knowledge about cultural artifacts by digitizing information and merging virtual elements such as texts, animations and audio in the real environment. This ability to enrich the sensory and cognitive experience is also highlighted by (Serravalle et al., 2019), who explain that AR increases visitor awareness by offering a comparison between what is observed in the physical world and what is shown through digital devices, promoting skills such as creativity and knowledge. (Zhang et al., 2024) complement this approach by pointing out that AR improves tourists' cognitive ability to appreciate destinations, providing immersive experiences that enrich their overall satisfaction.

Additionally, AR has the potential to transform tourism by offering interactive and personalized experiences, changing the way tourists search for information and make decisions. (Cranmer et al., 2020) highlight that the use of AR in the tourism sector has revolutionized the way tourists plan their trips and explore destinations, improving their participation and increasing the number of visitors. According to (Allal-Chérif, 2022), this technology has also been applied to cultural heritage, where, promoted by companies such as Meta, AR facilitates the conservation, restoration and valorization of monuments such as cathedrals, integrating an emotional approach in the transfer of knowledge. (Trunfio et al., 2022) and (Shafiee Roodposhti & Esmaeelbeigi, 2024) reinforce this idea by pointing out that AR transforms the physical space of museums and other heritage sites, using digital elements to improve the narrative and interaction with cultural heritage, which also contributes to the restoration of tourist attractions through 3D representations and navigation-based systems. Together, these studies show how AR not only improves the educational and cultural experience, but also increases tourists' satisfaction and engagement, making visits more memorable and accessible.

Challenges and Barriers

According to the studies analyzed, the use of immersive technologies such as augmented reality (AR) and virtual reality (VR) in tourism faces several challenges and barriers that can limit its adoption and effectiveness. A recurring problem pointed out by several authors is ease of use and accessibility. According to (Fan et al., 2022), the perceived complexity in the use of these technologies can deter users, since if they are difficult to manage, the benefits are not evident, reducing tourists' willingness to use them. Furthermore, (Peruzzini et al., 2023) mention that lack of familiarity with VR can affect users' natural interaction with virtual environments, which limits the experience and immersion. This is related to the studies of (Zhang et al., 2024), who point out that tourists' perception of technology is influenced by factors such as the quality of information, sophistication and cost, which can be important barriers to its acceptance.

In addition to the difficulties of use, the high costs associated with the adoption of immersive technologies are also a significant impediment, as pointed out by (Lee et al., 2020) and (Vishwakarma et al., 2020). VR devices and the infrastructure needed to deliver immersive experiences can be expensive, limiting their large-scale implementation, especially in travel agencies and tourist destinations. (Yin et al., 2024) identifies "dual" challenges in the management of cultural heritage tourism destinations, since, although it seeks to offer a good experience to tourists, it must also minimize interference. Despite the advantages of virtual tourism, it is difficult to fully reproduce the atmosphere and sensory experience of the destination, nor replace the interpersonal interaction of in-person tourism. (Trunfio et al., 2022)

They identify other technological and physical barriers, such as limitations in sensor tracking, lack of standardization, and device interference with art appreciation, which can create a less attractive experience for tourists. Likewise, "cyber sickness," as described (Yoon & Nam, 2024), is a significant negative effect, particularly in VR, where users experience symptoms of visual fatigue, nausea and dizziness due to the dissonance between physical movement and the virtual image, reducing the quality of the immersive experience.

In summary, although immersive technologies offer great advantages to enrich the tourist experience, their adoption faces significant barriers such as complexity of use, high cost, technological limitations and adverse effects on the health of users. These barriers must be overcome to maximize the potential of AR and VR in the tourism sector.

Training and Simulation for Tourism Professionals

Finally, training and simulation for tourism professionals is an area that is still developing; according to the results, only 3 of the included articles addressed the topic. (Leung et al., 2020) summarize that emerging technologies, especially VR, have the potential to be leveraged to train tourism professionals, both in education and in planning and management. (M. Lee et al., 2020), whose findings demonstrated that the impacts of VR quality on destination visit intention are highly positive, indicated that it would be very useful for destination marketing organizations to rely on the impact of these technologies, as it helps meeting and event planners to virtually explore possible destinations without the need to make physical visits, saving time and costs in promoting their places. In the same way, tour guides can practice their tours virtually, reducing expenses and at the same time improving training.

Going deeper beyond VR and AR, (Saeed et al., 2024) reflect in their research the adoption of the metaverse by organizations to improve the interactivity and flexibility of training, while maintaining the quality of educational content. These physical presence simulators enrich the training experience, facilitating personalized, immersive and collaborative training, promoting knowledge transfer and teamwork. It is an ideal tool for training staff in managing complex situations, such as customer service or crisis management.

Conclusions

In conclusion, immersive technologies are still in their early stages of development, it is clear that they have the potential to transform the way tourists interact with destinations and plan their trips. With the continued evolution of technology and the expansion of global connectivity, we can expect virtual reality, augmented reality and the metaverse to play an increasingly central role in the tourism industry, both in enriching experiences and democratizing access to places and activities that would otherwise be out of reach for many.

With the results of the systematized search, it was possible to identify 7 relevant aspects on which immersive technologies impact the tourism industry. Firstly, the enrichment of the tourist experience, since these technologies allow the creation of more immersive and personalized experiences, which results in a more intense and meaningful experience for tourists. Secondly, tourism promotion, these technologies are a key tool in tourism marketing and can be an effective way to attract tourists, especially when combined with high-quality content that offers a realistic and attractive vision of the destination. Third, virtual and pre-trip exploration, which allows tourists to adapt their itinerary to their personal interests, adjusting the experience according to their preferences.

Fourth, inclusive tourism and accessibility which addresses how immersive technologies can make tourism more accessible for people with disabilities or reduced mobility. Fifthly, augmented reality in tourism and heritage, Technologies improve tourists' understanding of cultural heritage and make the experience more dynamic and engaging, promoting a greater connection with the past. Sixth, although immersive technologies offer great benefits, there are also challenges and barriers among which are technological problems (such as the lack of adequate infrastructure in certain destinations or the need for specialized devices), high implementation costs for small tourism businesses, and resistance to change on the part of some industry actors. The adoption of these technologies requires a strategic approach to overcome these barriers. Finally, training and simulation for tourism professionals, an area that is still developing, but they highlight that the integration of immersive technologies in staff training can improve both the quality of service and operational efficiency in the tourism sector.

In short, immersive technologies are transforming the tourism industry in profound ways. From enriching the tourism experience to training professionals, these advances offer new opportunities to improve tourists' interaction with destinations and services, as well as to make tourism more inclusive and accessible. However, they also face challenges related to technology, costs and infrastructure, requiring careful planning and a collaborative approach between sector players.

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