



INNOVATIONS IN TOURISM: THE ROLE AND CHALLENGES OF IMMERSIVE SPACES

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Abstract:

In the modern tourism industry environment, immersive spaces represent a revolutionary concept that transforms the way visitors experience and interact with destinations. This paper focuses on analyzing the application of immersive technologies, including virtual reality (VR) and augmented reality (AR), with the aim of creating unique and engaging experiences for tourists. Through the analysis of existing literature, we explore how immersive spaces not only enhance visitors' emotional connection with the content but also stimulate their creativity and exploratory spirit. The paper highlights the key advantages that immersive spaces bring to tourist destinations, including a significant increase in visitor engagement and the creation of differentiated offerings that can attract a broader audience. Additionally, we consider the challenges faced by this technology, such as high implementation costs and the need for technical training of staff. We conclude that, with the right implementation strategy and continuous evaluation, immersive spaces have the potential to drastically improve the tourism offering and enrich visitor experiences, thereby opening up new opportunities for innovation in tourism. This paper not only provides insight into future research directions but also presents examples of best practices for tourism operators aiming to integrate immersive technologies into their offerings to achieve a competitive advantage in the market.

Keywords:

Virtual reality (VR), Augmented reality (AR), Immersive technologies, Immersive intelligence.

INTRODUCTION

Immersive spaces represent an innovative concept that utilizes modern technologies, such as virtual reality (VR) and augmented reality (AR), to create interactive experiences allowing users to fully immerse themselves into the new environments. These technologies significantly change how information is presented to users (Milgram and Kishino, 1994) and open new opportunities for education, promotion and entertainment in the tourism industry, helping destinations stand out in a competitive market.

The development of immersive spaces is crucial in light of changing visitor expectations, as they seek unique and unforgettable experiences. In the era of digitalization and rapid technological changes, the tourism sector must adapt to meet the needs of modern travelers.

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These experiences not only increase visitor engagement but also strengthen their emotional connection to the destination, potentially leading to repeat visits and provide with further recommendations (Huang and Liao, 2015).

Modern technologies allow users to experience destinations in exciting ways. For example, VR can simulate travel to exotic locations, while AR enhances real locations with interactive content and information. This combination significantly enhances the user experience, making it more interactive and personalized (Guttentag, 2010). However, challenges in implementing immersive spaces include technological infrastructure, costs, and staff training, which can impact the success of these initiatives (Youssef *et al.*, 2023). This paper focuses on defining immersive spaces, their application in tourism, implementation challenges, and how strategic integration of these technologies can enhance the tourism offering.

LITERATURE REVIEW

The tourism industry is undergoing a significant transformation with the advent of immersive technologies. Early work by Scagliarini *et al.* (2001) demonstrated the potential of VR for enhancing understanding and engagement at cultural heritage sites like Pompeii. Additionally, Milgram & Kishino's (1994) taxonomy of mixed reality visual displays provided a foundational framework for understanding the spectrum of immersive technologies and their potential applications. Guttentag (2010) provided an early exploration of virtual reality, highlighting its potential for destination marketing, virtual tours, and enhancing tourist experiences. Research indicates that immersive technologies have a positive impact on tourist experiences, particularly in enhancing enjoyment, engagement, and perceived value. Flavián *et al.* (2019) expanded the range by examining the impact of virtual, augmented, and mixed reality on customer experience across various sectors, including tourism. Fan *et al.* (2022) conducted a meta-analysis that revealed these beneficial effects. Zeng *et al.* (2020) found that VR experiences combined with online reviews significantly influenced hotel booking decisions. Moreover, Kang (2020) highlighted the potential of VR to stimulate impulsive travel desires by providing immersive previews of destinations. Immersive technologies serve as powerful tools for preserving and experiencing cultural heritage. Jung & tom Dieck (2017) explored the use of AR, VR, and 3D printing for co-creating valuable visitor experiences at cultural heritage sites. Rateb *et al.* (2020) showcased the use of immersive VR for exploring ancient Egypt's Giza Plateau, providing tourists with engaging and informative experiences. Furthermore, Youssef *et al.* (2023) demonstrated the potential of AR for virtually reconstructing heritage sites in Luxor, thereby enhancing accessibility and understanding of sites. The application of immersive technologies extends into destination marketing and information delivery. Sasaki & Yamamoto (2019) presented a sightseeing support system utilizing AR and pictograms to enhance navigation and information access for tourists in urban areas. Additionally, Zhang (2020) explored the use of gamified AR travel guides to improve user experience and engagement in city tourism.

Understanding how immersive experiences can influence tourist behavior and decision-making is essential. Huang & Liao (2015) investigated the acceptance of AR interactive technology, highlighting the moderating role of cognitive innovativeness in user adoption. Yoon & Uysal (2005) examined the relationship between motivation, satisfaction, and destination loyalty, laying the groundwork for understanding how such experiences can contribute to repeat visitation. Lampropoulos (2023) explored the intersection of augmented reality and artificial intelligence in creating immersive intelligent tutoring systems, suggesting potential applications for enhancing tourist learning and engagement at cultural heritage sites.

Despite the immense potential, the widespread adoption of immersive technologies in tourism faces challenges. Sousa *et al.* (2024) identified barriers to implementing VR for tourism managers, including cost, technological expertise, and resistance to change. Shehade & Stylianou-Lambert (2020) explored the experiences of museum professionals incorporating VR, emphasizing the need for careful planning and consideration of visitor needs. Duan *et al.* (2019) discussed the role of artificial intelligence in tourism decision-making, highlighting the importance of addressing ethical concerns and ensuring data privacy. Ionescu & Sârbu (2024) explored the impact of smart technologies on the tourism industry, emphasizing the need for sustainable and responsible development. Additionally, Sustacha *et al.* (2023) conducted a meta-analysis on technology's role in enhancing tourist experiences in smart destinations, suggesting future research directions for optimizing



the integration of immersive technologies. Beyond the immediate tourist experience, researchers have also examined the broader impacts of tourism development on residents. Godovykh & Ridderstaat (2020) investigated the long-term effects of tourism arrivals on residents' health, while Godovykh *et al.* (2023) explored the impact of tourism on residents' happiness, emphasizing the importance of sustainable tourism practices. Much of the existing research has focused on general tourist demographics, often overlooking the experiences of diverse populations, including older adults, individuals with disabilities, and non-tech-savvy users. Future research should investigate how different user groups interact with immersive technologies, ensuring that these tools are inclusive and enhance the experience for all.

Immersive technologies hold immense potential for revolutionizing the tourism industry by offering tourists engaging and enriching experiences. However, addressing challenges related to cost, accessibility, and ethical considerations is crucial for successful implementation. Future research should focus on user experience design, accessibility for diverse populations, and the long-term impacts of immersive technologies on tourist behavior and destination sustainability.

METHODOLOGY

This article aims to explain how the application of immersive spaces in tourism can enable destinations to achieve a strategic market position. To gather data, we analyzed academic literature and research reports related to immersive technologies and their application in the tourism sector. For the purposes of this research, data were collected from journals, conference papers, and other available relevant sources. The search results were limited exclusively to works written in English, opening additional space for future research in other languages.

IMMERSIVE SPACE TECHNOLOGIES AND BEST PRACTICES

Immersive space technologies enable users to connect with content in ways that surpass traditional interaction methods and can increase the quality of visitors' experience of a destination (Zeng *et al.*, 2020). Immersive intelligence combines Artificial Intelligence (AI) and Immersive technologies and has the potential to greatly improve experiences. Immersive technologies provide engaging, interactive and motivating mixed reality environments while AI offers personalized experiences (Lampropoulos, 2023). By utilizing AI's ability to analyze visitor preferences and behaviors it is possible to create personalized itineraries, while Immersive technologies enhance experiences by adding real-time insights and deepens tourist's understanding of cultural heritage through interactive learning and visualizations at historical locations. AI plays a big role in enhancing Immersive Intelligence by enabling personalization, real-time interaction, adaptive storytelling, and contextual awareness. Its ability to analyze data and learn from user interactions allows creation of more engaging and relevant experiences. As AI technology continues to evolve, its integration with immersive environments will likely lead to even more innovative applications. We focus on virtual reality (VR) and augmented reality (AR) and their application in the tourism sector.

Virtual reality (VR) uses computer simulations to create three-dimensional environments that users can explore and interact with, mimicking the real world. Users typically use equipment like VR headset or sensor gloves to fully immerse in the digital environment, manipulating objects, hearing sounds, feeling vibrations, and more. In the tourism industry, VR is used to simulate journeys and experiences that might be difficult or costly to achieve. It offers the ability to provide new experiences and information to individuals, unrestricted by time and space. It seamlessly integrates the digital realm with our physical environment, allowing people to encounter distant or even imaginary objects as if they were right in front of them. Users can explore these objects from any angle, resulting in a rich and immersive experience that brings to life what was once only a fabrication of our imagination (Kang, 2020). For example, many museums and galleries offer virtual tours that allow visitors to explore artworks or historical sites from the comfort of their homes (Guttentag, 2010).



Augmented reality (AR) enriches the real world with digital content visible through smartphones, tablets, or specialized glasses. AR allows users to see digital information overlaid on physical objects, creating a richer and more interactive experience. In tourism, AR is often used to provide additional information about landmarks, such as historical facts or interactive guides, enhancing visitor experiences (Fan *et al.*, 2022). For example, some tourist destinations use AR applications that let users scan QR codes near landmarks to receive more information or visualize historical events.

We will present several examples of tourist destinations that have successfully implemented immersive spaces. These examples illustrate how technologies like virtual reality (VR) and augmented reality (AR) can transform visitor experiences, expand tourism offerings, and positively impact the local economy.

Immersive spaces in museums are revolutionizing visitor experiences through the use of virtual reality (VR). For instance, the San Diego Museum of Art employs VR technology to allow visitors to “peek” into the artistic processes of renowned artists. This innovative approach enhances visitor engagement by providing immersive storytelling experiences and enabling users to be transported to inaccessible locations or specific moments in history. As a result, the emotional and internal engagement with museum collections is heightened, moving beyond the traditional interpretation of artworks through written text (Shehade and Stylianou-Lambert, 2020). Similarly, Egyptian museums have adopted VR tours that enable visitors to explore ancient tombs and pyramids without the need for physical presence. These virtual tours have gained popularity, especially among individuals who are unable to travel to Egypt, thereby increasing global interest in Egyptian culture and history. Studies indicate a significant rise in online interactions and interest in educational content related to these virtual experiences (Rateb *et al.*, 2020).

Immersive spaces at historical sites are exemplified by the “Casa del Centenario” in Pompeii, where virtual models developed from reconstructive hypotheses by archaeologists can be experienced on-site. Visitors can engage with these models on mobile tablets as well as on high-performance display stations, which are controlled via the tablets. This system allows for immediate comparison between the current environment and its original state by enabling simultaneous viewing of two synchronized virtual reconstructions. Moreover, intuitive navigation within these virtual worlds is enhanced by the tablet’s sensitivity to rotation, enriching the overall user experience (Scagliarini *et al.*, 2001).

Immersive Spaces in cities are illustrated by Japan’s smart cities, which utilize object-recognition augmented reality (AR) to enhance the sightseeing experience. By pointing a mobile information terminal at actual landmarks or their images, users can recognize these spots and access related information displayed on the screen. Additionally, users have the option to switch between object-recognition AR and location-based AR (Sasaki and Yamamoto, 2019). Another example is “Unlocking Porto,” an app designed for the city of Porto that offers a unique experience through a location-based game. Users embark on a narrative journey that guides them to the city’s main attractions, following a path enriched with augmented reality elements. Throughout the game, players can engage in various mini-games, which further enhance their exploration and interaction with the city (Zhang, 2020).

Examples of successful implementation of immersive spaces in tourism demonstrate how integrating VR and AR technologies can significantly enrich visitor experiences, enhance engagement, and contribute to the local economy. These practices provide important lessons for future projects in the tourism sector.

DISCUSSION AND RESULTS

Given that consumers today increasingly seek personalized experiences, it is essential to understand how immersive spaces fit into the broader context of tourism strategies. In addition to the benefits they bring, such as enhancing emotional connections and increasing satisfaction, there are also several challenges that need to be addressed. This section of the paper will focus on analyzing the research results and discussing how tourism operators can overcome obstacles on the path to integrating these innovative solutions. Through this analysis, the aim is to provide insight into the opportunities that immersive spaces offer, as well as the strategies needed for their successful implementation.



Immersive spaces represent a revolutionary approach in tourism, allowing tourists to fully immerse themselves in unique experiences that transcend traditional forms of tourism. One of the key trends in tourism is the growing popularity of personalized experiences. Tourists today increasingly seek unique and tailored offerings that reflect their personal interests and preferences. Travelers prefer destinations that utilize technology to provide personalized recommendations based on their previous experiences and searches, and travel agencies can use it to collect and analyze data to help develop better services and offerings (Sustacha *et al.* 2023). For instance, smart devices can provide real-time information about local events or attractions, as well as recommendations based on the user's current location. This type of interaction can significantly enrich the travel experience and make it more efficient (Ionescu and Sârbu, 2024). Tourists are actively involved in creating their adventures, which can lead to positive reviews and recommendations, as well as a greater emotional connection to the destination (Yoon and Uysal, 2005). This personalization not only enhances the experience but also strengthens the reputation of destinations as places that offer unique and unforgettable adventures, significantly contributing to the promotion of the destination and its visibility in a competitive market. Furthermore, immersive spaces help destinations stand out in a crowded market. In a world of ever-increasing competition, the ability to offer innovative and interactive experiences becomes crucial. Destinations that successfully integrate immersive experiences into their offerings can attract a larger number of visitors and achieve higher levels of satisfaction and loyalty (Flavián *et al.*, 2019). Increased engagement, emotional connections, and the ability to create unforgettable experiences contribute to the rising popularity of immersive experiences in the tourism industry.

Despite the numerous advantages that immersive spaces offer in tourism, their implementation faces various challenges. The most significant issues include high technology costs, technical barriers and the need for staff training. These challenges can complicate the adoption of immersive technologies, especially for smaller destinations or businesses with limited resources (Sousa *et al.*, 2024). High technology costs represent one of the main factors that can slow down the introduction of immersive experiences. Acquiring and maintaining advanced devices such as VR headsets and augmented reality software are often beyond the budgets of smaller tourism operators. To overcome this problem, it is important to consider strategies such as partnerships with technology firms that can help reduce costs and provide necessary technical support, as well as developing smaller pilot projects that can test the application of immersive technologies and user reactions before larger investments and broader implementation. Technical barriers, such as internet connectivity issues and the availability of necessary infrastructure, can also complicate the implementation of immersive spaces. In rural or less developed areas, the lack of adequate technology can pose a significant challenge, necessitating investment in infrastructure such as high-speed internet and technological devices. Developing local capacities and training staff to use new technologies become key steps toward successful implementation (Godovykh *et al.*, 2023). Workers must be trained to work with new technologies, as well as to interact with visitors in a way that enhances their experience. Investing in training and education can significantly improve service quality and visitor satisfaction, as well as contribute to the overall well-being of locals in the long term (Godovykh and Ridderstaat, 2020). Involving local residents in creating content to be displayed through AI technologies has proven to be a significant factor in reducing locals' animosity toward innovation. It is also important to emphasize the significance of continuously collecting feedback from visitors after using immersive experiences, as this can help identify areas for improvement and adjust offerings. Although immersive spaces offer significant advantages in tourism, the challenges in their implementation are real and require careful planning and strategies to overcome. Partnerships with technology companies and the development of local capacities represent key steps in addressing these obstacles.

CONCLUSION

Immersive spaces, through the application of technologies such as virtual and augmented reality, represent a significant shift in how tourists experience destinations. In a world where travelers increasingly seek personalized and unforgettable experiences, immersive spaces offer innovative solutions that can meet these demands. Based on the analysis of literature and best practice examples, we can conclude that these technologies are crucial for the future of the tourism industry.



Through interactive elements, tourists can explore and learn in ways that exceed traditional methods. AI systems are increasingly becoming a core part of digital systems, significantly influencing how people make decisions (Duan *et al.*, 2019). These spaces not only enhance traveler satisfaction but also encourage repeat visits and positive recommendations. Consumer data analysis enables the creation of customized itineraries, contributing to increased user satisfaction and loyalty. In addition to enriching visitor experiences, immersive spaces play a key role in differentiating tourist destinations in a crowded market. Through innovative technologies, destinations can offer unique attractions that appeal to a broader audience and stimulate a higher number of visits. These technological solutions help create more efficient and satisfying user experiences, which are critical for long-term competitiveness in the market.

Moreover, building communities around immersive experiences and encouraging information exchange among users further strengthens the connections between service providers and users. Organizing workshops and events plays an important role in building long-term brand support, ensuring continuous growth and development of the destination. The implementation of immersive technologies also opens doors to new opportunities in exploration and education. For instance, virtual tours and AR applications can provide deeper insights into the cultural and historical aspects of destinations, promoting greater understanding and respect for local culture. This is especially important in the context of sustainable tourism, where the goal is not only to attract visitors but also to preserve and promote local heritage (Jung and tom Dieck, 2017).

Immersive spaces represent an important advancement for the tourism industry, enabling destinations to adapt to modern traveler expectations. Through careful implementation and continuous evaluation of visitor experiences, these technologies can significantly enhance the tourism offering and contribute to sustainable development. Investing in infrastructure and staff training, as well as involving the local population, can greatly improve service quality and support the sustainable development of tourism. In this way, immersive spaces have the potential to redefine tourism offerings, creating unique and unforgettable adventures for visitors while simultaneously contributing to the economic development of local communities.

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