

"IMPROVING THE TOURISM INDUSTRY THROUGH VIRTUAL REALITY"

Research Paper

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"Abstract"

This article provides an objective overview of the positive and negative impact of virtual reality (VR) in the tourism industry and on tourists. It aims to summarize the current knowledge on VR in tourism and discusses the possibilities of immersive VR systems. The article adopts a methodological approach and suggests specific meanings for different groups. It analyses previous literature on VR in tourism from 2000 to October 2023, gathering information from various sources to explore the potential applications of VR in the industry. Additionally, the study offers practical implications for tourism corporations and identifies areas for future research. The overall goal of the article is to contribute to a deeper understanding of VR research in the tourism industry.

Keywords: virtual reality in tourism, immersive experiences, positive and negative impact of virtual reality, virtual tours, virtual museums.

1 Introduction

Virtual reality (VR) has gained significant attention and application in various industries, including travels. The tourism & hospitality sector is continuously developing and seeking novel ways to enhance the unique experience of visitors globally. The emergence of technology has introduced virtual reality as an advanced mechanism that holds the potential to transform the tourism industry (Bilotta et al., 2021; Pokojaska and Pokojski 2012; Lee and Kim, 2021; Huang et al., 2020; Nagpal and Prakash, 2020; Wilde and Andersen, 2009; Makai, 2010). VR enables users to virtually explore destination sites, attractions, and cultural objects, offering insight into travel-related experiences without the need for physical presence (Zhang et al., 2022; Zaplata and Kwiatek, 2019; Korinth, 2020; Tussyadiah et al., 2018; Guttentag, 2010; Kersten and Tschirschwitz and Deggim, 2017; Jung and Dieck, 2017; Neuburger and Beck and Egger, 2018; Barends 2016).

The incorporation of virtual reality technology within the travel industry can alter how individuals engage with destinations. It is a technology that creates an immersive and interactive simulated environment using headsets and motion-tracking sensors. This has the potential to revolutionize the travel industry significantly. Virtual reality experiences enable tourists to submerge themselves in virtual surroundings that precisely replicate real locations, thus providing a realistic and immersive experience (Beck et al., 2019; Tang and Boccia and Lim, 2014; Wei et al., 2019; Bogicevic et al., 2019; Kelly et al., 2014; Carbonell-Carrera and Saorin, 2023; Slater et al., 2009; Radianti et al., 2020; Craig, et al., 2022; Khodr et al., 2020). In the tourism industry, VR is being recognized as a powerful tool to enhance the tourism experience. Virtual tours, museums, historical sites, and natural wonders can be made accessible to global audiences, overcoming geographical barriers and time restrictions. The use of VR in tourism offers several benefits. It allows tourists to virtually explore destinations and attractions, helping them make informed decisions and improving their pre-trip experience. It also has educational and

training applications, providing cultural experiences for tourists, and enabling professionals to improve their skills in a virtual environment. (Jung and Dieck, 2017; Kersten and Tschirschwitz and Deggim, 2017; Zhang et al., 2022; Pestek and Sarvan, 2020; Kask, 2018; Korinth, 2020; Tussyadiah et al., 2018; Polechonski and Tomnik, 2012).

Virtual tours lack physical presence and sensory experience, which limits the authenticity and perspective of a place. The literature reveals deficiencies in understanding the psychological mechanisms underlying the perception of virtual tours (Grüter and Myrach, 2012). In addition, they limit social interaction, have technical limitations, provide unrealistic representations, and can increase over-reliance on technology (Merkx and Nawijn, 2021).

Research indicates that virtual reality tourism can have a detrimental effect on virtual reality tourism practitioners (Rebenitsch and Owen, 2016; Akiduki et al, 2003; Davis, 2014). Nevertheless, it is important to acknowledge that these negative consequences may not be universal across all virtual tours. This article aims to assess the potential impact of virtual reality on the tourism sector. It highlights the beneficial aspects that virtual reality can offer to enhance the travel experience, such as immersive and tailored experiences. However, it also recognises the obstacles that require attention to be fruitfully implemented, including obstacles such as technology, loneliness, cyber disease. Research provides an in-depth analysis of these challenges and suggests viable responses. The article aims to better understand how virtual reality can improve the tourism industry, as well as identify opportunities for improvement. Addressing these challenges will allow the industry to realise the potential of virtual reality and provide a more immersive and engaging travel experience.

1.1 Research questions

RQ 1. How has virtual reality technology emerged and evolved in the tourism industry?

RQ 2. What virtual reality can offer to enhance travel experiences?

RQ 3. Does the negative impact of virtual tourism influence the wellbeing of tourists?

2 Methodology

The aim of this investigation is to evaluate the implications and potential advantages of utilising virtual reality (VR) technology within the tourism sector. This research is implemented with a scientific methodology consisting of objective and lucid language, a conventional format, and a judicious selection of terminology. Through an extensive literature search encompassing publications published from 2000 to 2023, this study aspires to offer informative insights into the function of VR technology in the tourism industry.

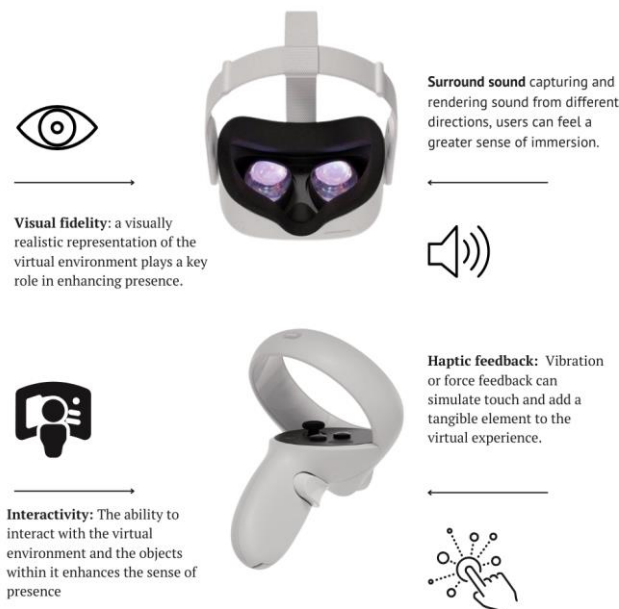
To conduct this study, an exhaustive literature review was conducted through various databases, which comprised of scholarly journals, conference proceedings, and online research repositories. The search keywords employed include "virtual reality positive and negative impact," "virtual tours implications," "virtual reality experience," and "benefits of VR in tourism." These terminologies helped to narrow down the search results. To be considered for review, articles had to satisfy specific requirements, including being connected to VR usage within the tourism industry, being published in English and Polish between 2000 and 2023, and adhering to a pre-determined structure.

During data collection, critical aspects like author and year of publication, research methods, sample size, the impact of VR on tourism, advantages, disadvantages, and proposals for the future were collated. A methodical methodology was utilized in the scrutiny of data, categorizing the extracted information into consistent themes and categories. These comprised of the uses of VR in distinct tourism domains, specifically the fields of hospitality, adventure tourism, and cultural tourism, along with the advantages, disadvantages, and challenges faced when implementing VR. A comparison analysis and synthesis were performed to recognise prevalent patterns and significant discoveries from multiple investigations.

3 Overview of Virtual Reality Technology

Presence in a virtual environment refers to the cognitive, emotional, and physical immersion that allows users to interact with the virtual world as if they were physically present. This sense of presence is crucial for engaging with virtual experiences (Beck et al., 2019). Virtual reality offers the opportunity to overcome physical and geographical limitations, allowing users to explore remote or inaccessible places without being there. This can expand travel options and introduce tourists to new and undiscovered locations (Wei et al., 2019).

Headsets Oculus Quest VR Google (Figure 1) are worn on the head and usually comprise a display monitor for each eye, offering a stereoscopic view. Integrated speakers or headphones may also be incorporated into these headsets for audio. High-quality images, accurate lighting, and advanced rendering techniques all enhance the immersive experience (Carbonell-Carrera and Saorin, 2023; Craig, et al., 2022; Bernardo, 2017).



Picture 1. Description of Oculus Quest Virtual reality glasses. Source: Autor`s work.

VR controllers allow users to interact with the virtual environment by tracking hand movements, enabling them to pick up objects, manoeuvre through the simulation, and execute various functions (Bogicevic et al., 2019; Dalgarno and Lee, 2010; Salvato et al., 2022).

Sensors and Tracking Systems (Figure 2). VR systems frequently utilise sensors and tracking systems to deliver an uninterrupted experience. These technologies monitor the user's movements and adapt the virtual environment in response, resulting in a captivating and reactive environment (Verlust, 2021; Saint-Louis, and Hamam, 2021; Chen and Lu & Ochai, 2022).



User using Virtual Reality Glasses.



The visual perspective of a person using virtual reality glasses.

Picture 2. Visualisation of the user and his/her perspective during the experience of VR. Source: Author's work.

3.1 VR goggles as a sustainable tool enchanting tourist experience

Virtual reality (VR) headsets are a popular tool in the tourism industry for providing virtual tours. In addition, VR headsets can provide a more immersive and enhanced tourism experience in several ways. In the first place, tourists can explore museums and exhibitions virtually, taking in the artefacts and exhibits from different eras and cultures (Tussyadiah et al., 2018; Kersten and Tschirschwitz and Deggim, 2017). Such virtual visits can provide an educational and engaging experience (Xiang and Sheldon, 2019; Bilotta et al., 2022; Na and Weihua, 2012). Virtual Reality goggles can help to overcome these limitations since they provide virtual experiences that closely mimic real destinations (Zhan et al., 2022; Korinth, 2020).

Furthermore, VR can submerge holidaymakers in diverse cultures and traditions, fostering cross-cultural awareness. Finally, VR headsets can recreate past events or eras, heightening visitor understanding and involvement at historical locations and museums (Kersten and Tschirschwitz and Deggim, 2017; Polechonski and Tomnik, 2012; Zhang et al. 2022).

It is important to bear in mind that virtual reality (VR) is a supplementary instrument and must not replace genuine travel experiences or face-to-face interactions.

Virtual reality can promote sustainable tourism practices. According to Schipou et al. (2021), and Crossley (2020), offering virtual experiences allows tourists to explore destinations without travelling long distances, thus reducing their carbon footprint. This approach aligns with sustainable tourism principles by minimizing negative environmental impacts associated with traditional physical travel. Virtual reality can also enhance physical travel by enabling tourists to virtually explore multiple destinations before selecting their next trip. This enables travelers to make more informed decisions, thereby potentially reducing the number of unnecessary journeys (Talwar et al., 2022; Gutentag, 2010; Griffin et al., 2017; Skard et al., 2021).

The integration of virtual reality into the tourism industry offers an opportunity to promote sustainability and contribute to the preservation of the environment.

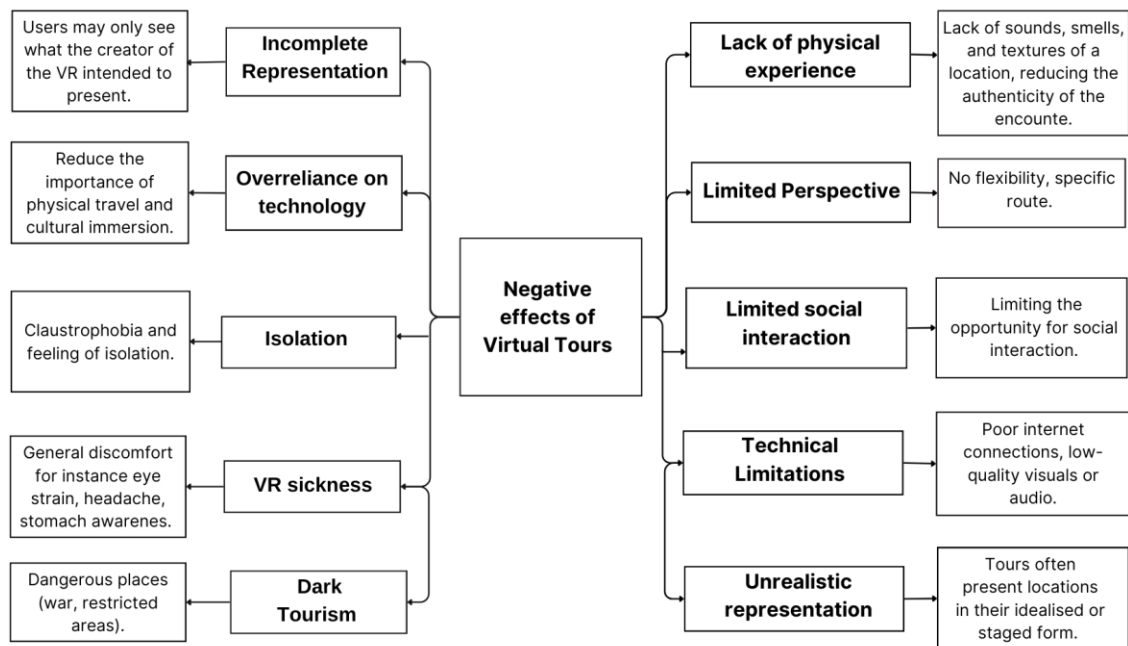
4 Current utilization of virtual reality in the tourism industry

According to Huang et al. (2014) and Barrens (2016), Virtual Reality is revolutionizing all travel industry and transforming how tourists explore and experience destinations (Huang et al., 2013; Polechonski and Tomnik, 2019). Through virtual tours, companies like YouVisit and Matterport allow travellers to virtually visit popular tourist attractions, hotels and cultural sites, providing an immersive and informative experience that streamlines the trip planning process (Talwar et al., 2022). Virtual travel experiences offered by companies like Virtually Visiting and Ascape take this a step further, allowing tourists to virtually visit landmarks around the world, participate in virtual events and explore fantastical destinations (Gutentag, 2010; An and Choi and Lee, 2021; Tussyadiah et al., 2018). These experiences offer a sense of presence and immersion, providing unique and unforgettable adventures. In addition to virtual tours and travel experiences, VR has become a powerful tool for the travel industry to create immersive marketing campaigns (An and Choi and Lee, 2021; Griffin et al., 2017; Epple, 2018; Gibson and O'Rawe, 2018). Tourism Australia's '360-Degree Coastal Cruise' campaign, for example, virtually transports viewers on a boat ride along the country's coastline, generating excitement and increasing interest in visiting Australia. Museums, cultural and natural heritage sites and cultural venues are also utilizing VR to enhance visitor experiences (Wedel and Bigne and Zhang, 2020; Korinth, 2020; Jung and Dieck 2017; Tussyadiah et al., 2018; Kersten and Tschirschwitz and Deggim, 2017; Polechonski and Tomnik, 2012; Zhang et al. 2022). The British Museum's 'Museum of the World' VR experience, developed in collaboration with Oculus, allows users to explore and interact with artefacts from different periods, bringing history and culture to life in an innovative way. VR is not only transforming the customer experience, but also enhancing safety and training in the tourism industry. Airlines use VR simulations to train flight crews on emergency procedures, improving safety and preparedness. Hotels and hospitality companies use VR to train staff in customer service and simulated scenarios, ultimately improving the overall guest experience. There have been notable successes in integrating VR into marketing and customer experience in the travel industry (An and Choi and Lee, 2021; Beck et al., 2018). Abu Dhabi Tourism developed a VR app that allows users to virtually explore the city's attractions and immerse themselves in Emirati culture. This app has increased awareness and interest in visiting Abu Dhabi, showcasing the potential of VR to attract and engage potential travellers. Overall, VR is revolutionizing the tourism industry by offering virtual tours, travel experiences, immersive marketing campaigns, museum enhancements and training applications. These examples demonstrate the increasing use of VR technology to enhance the tourism experience, increase engagement and ultimately attract more tourists to destinations around the world (Yeh et al., 2017; Giffin et al., 2017; Tussyadiah et al., 2018).

4.1 Negative impacts of virtual tours

One significant drawback is the absence of physical experience. Virtual tours cannot replicate the physical presence and sensory experience of being in a location. The sensations felt during a virtual tour shape one's notion of transitioning from reality to the digital realm (Wei et al., 2019). However, the literature presents gaps in understanding the psychological mechanisms behind virtual tours in relation to this perception (Grüter and Myrach, 2012).

Users are unable to experience the actual sounds, smells, and textures of a place, which can reduce the genuineness of the experience. Another limitation is the restricted viewpoint that virtual tours provide. Virtual tours, unlike exploring a location in person, tend to adhere to predetermined paths, thereby restricting the user's ability to move freely or explore specific areas of interest, thus leading to a narrower perspective of the place.



Picture 3. Negative effects of Virtual tours. Source Author's work.

Furthermore, virtual tours typically lack social interaction as they are usually experienced individually, thus limiting the chances of shared experiences with others. The lack of interpersonal connections can diminish the overall pleasure and social experience of visiting a location. Nawijn and Biran, (2019) note a scarcity of studies examining adverse emotional responses within the literature on virtual tourist experiences. The author has outlined the most evident drawbacks of employing virtual tours (Figure 3). Technical constraints are also worth considering. Virtual tours rely heavily on technology, which can make them susceptible to technical glitches and limitations. Poor internet connectivity, low-quality visuals or audio, or system compatibility issues can impede the user's experience and detract from the tour's appeal. Moreover, virtual tours frequently depict sites in an artificial or embellished manner, which may not genuinely portray the real settings or ambiance of a location.

Merkx and Nawijn (2021) report that respondents of their survey expressed concerns about isolation while using Google's VR This was accompanied by feelings of isolation and even claustrophobia.

In scientific literature, the adverse effects of virtual reality are studied with regard to cyber sickness, which encompasses symptoms such as nausea, perspiration, vomiting, disorientation, headache, increased salivation and physical exhaustion (Wibirama and Nugroho, and Hamamoto, 2019; Mittelstaedt, Wacker and Stelling, 2019; Rebenitsch and Owen, 2016; Akiduki et al., 2003; Davis, Nesbitt and Nalivaiko, 2014).

Such discrepancies may engender delusive expectations, particularly when users intend to visit the actual place afterwards and realize that it varies from their virtual experience. To add, virtual tours may not offer a comprehensive depiction of a locale. Certain areas or aspects may have been omitted or overlooked, and users may only view what the virtual tour creator intends to present. Such limited representation may lead to a partial understanding or misrepresentation of a place. Basso, (2017) posits that virtual reality has a substantial drawback, as it tends to alienate users from the real world.

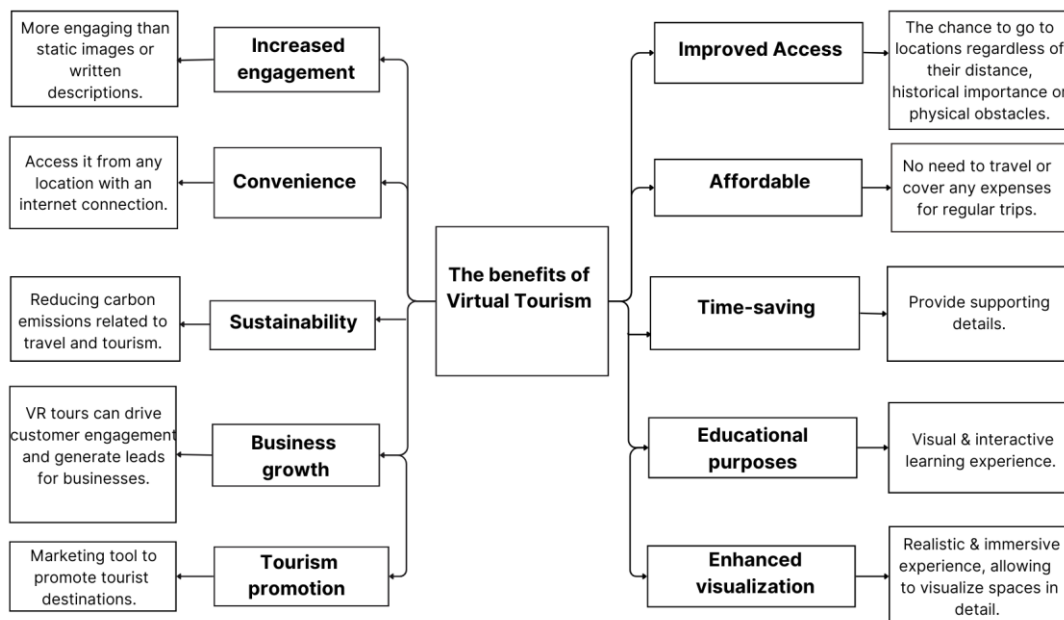
Especially in the realm of virtual dark tourism, featuring hazardous environments like war zones, casinos, cemeteries, and hospitals, it creates non-existent threats that distract users from and obscure real-world risks (McDaniel, 2018). An intriguing investigation was carried out by Griffin and Muldoon (2019), who displayed an interest in a particular type of slum tourism. A noteworthy discovery revealed

that the heightened awareness of issues, both in general and in relation to slum tourism, poses a considerable difficulty in the real world. Virtual tours can lead to overreliance on technology for travel experiences. This tendency can discourage real-world exploration and potentially detract from the significance of physical travel and cultural immersion. It should be noted that not all virtual tours will result in negative effects, as the quality and experience may differ based on the tour or platform utilized.

4.2 Positive impacts of virtual tours

Virtual tours offer a range of benefits, including increased accessibility to places that may be physically inaccessible to some individuals. This includes remote locations, historical sites, and landmarks (Zhang et al., 2022; Jung and Dieck, 2017) This is particularly advantageous for those with mobility limitations or those who cannot travel. Additionally, virtual tours are cost-effective, as they eliminate the need for travel, accommodation, and other associated expenses. This means that individuals can virtually visit multiple destinations without straining their budget.

Another advantage of virtual tours is the time savings they offer. Rather than spending days traveling to different destinations, individuals can explore various places in a shorter amount of time (Chen and Li, 2020). This is especially beneficial for those with limited holiday time or busy schedules. A study conducted by Skard et al., (2021) discovered that exposure to virtual reality led to enhanced mental imagery and higher predictions of happiness. The findings suggest that virtual reality could have potential therapeutic and positive effects on individuals' mental health. It is important to further investigate these results to understand the mechanisms through which virtual reality can impact mental health positively. Furthermore, virtual tours serve educational purposes, providing students of all ages with a visual and interactive learning experience. This aids in the understanding of complex concepts and improves information retention (Xiang and Sheldon, 2019; Bilotta et al., 2022; Wiliam et al., 2004). Virtual tours also enhance visualisation capabilities, offering a realistic and immersive experience that allows users to observe spaces in detail (Joiner, 2018; Talwar et al., 2022, Gutentag, 2010).



Picture 4. The benefits of Virtual Tourism: Source Autor's work.

This benefit is particularly valuable for real estate agents, architects, and interior designers, as it enables them to present properties and projects more effectively. Below is a representation of the benefits of utilizing virtual tourism (Figure 4).

Furthermore, virtual tours are often more engaging than static images or descriptions, stimulating curiosity and holding the viewer's attention for longer periods of time. This increased engagement and interest can lead to more exploration and discovery. The convenience of virtual tours is another key advantage. They can be accessed from anywhere with an internet connection, allowing users to explore destinations or properties at their own pace and without restrictions. This differs from traditional guided tours, which require adherence to a specific schedule and location. From a sustainability standpoint, virtual tours contribute to reducing the carbon footprint associated with travel and tourism. By allowing people to explore places virtually, less fossil fuel consumption occurs, resulting in a reduced environmental impact (Schipou et al., 2021 and Tussyadiah et al., 2018)

According Tussyadiah et al. (2018), Korinth, (2020), Polechonski & Tomik, (2019), virtual tours have the potential to drive business development. They can increase customer engagement and generate leads by providing potential customers with a detailed experience of products, services, or properties, without the need for physical visits (Chen & Li, 2022; Zhang et al., 2022; Pokojska and Pokojski, 2012). This can ultimately lead to increased sales and promote business growth. Furthermore, virtual tours can be utilized as a tool for tourism promotion. By showcasing the beauty and attractions of a destination through virtual tours, potential travellers can be enticed to visit, boosting tourism in the area (Tussyadiah et al., 2018; Kersten and Tschirschwitz and Deggim, 2017; Polechonski and Tomnik, 2012; Gutentag, 2010).

5 Challenges and limitations in virtual reality tourism

The integration of virtual reality (VR) technology in the tourism industry shows excellent potential for revolutionising the way individuals plan and relish their holidays.

However, accessibility and infrastructure remain leading impediments to the widespread implementation of VR technology in tourism. The need for hardware and software, including high-quality headsets, robust computer systems, and an uninterrupted internet connection, presents significant challenges. These requirements could limit VR access for various tourists, particularly those from underdeveloped areas. Moreover, providing real-time VR experiences can pose a challenge due to the lack of dependable internet connections in remote tourist locations.

Furthermore, the cost of implementing the VR technology, including hardware, software development, and maintenance, can be sizeable. VR technology is currently quite expensive, limiting its use to larger tourism organisations with more resources and discouraging smaller businesses. In addition, the cost of renting or using VR equipment may deter potential users, which raises concerns about the accessibility of VR experiences to tourists.

5.1 Positive challenges

1. Enhanced Travel Planning: Virtual Reality technology can offer immersive and realistic virtual experiences of tourist destinations, enabling travellers to explore and assess potential destinations before making a booking decision. This advanced visualization capability allows tourists to make more informed choices and enhances their overall travel planning experience.

2. Augmented Experiences: By incorporating virtual reality technology into tourist attractions and activities, destinations can enhance the experiences for their visitors. For instance, historical sites can use VR to recreate past events, which allows tourists to step back in time and gain a more profound appreciation of the cultural and historical significance of a particular location. Similarly, wildlife reserves can offer virtual safaris, providing an up-close and personal encounter with animals in their natural habitats. These augmented experiences have the potential to enhance guest satisfaction and entice new tourists to visit.

5.2 Negative challenges

1. VR experiences may lack personal connection, as they can be immersive yet lack the human interaction integral to travel experiences. The absence of physical contact and face-to-face interactions could diminish the emotional connection between tourists and the destinations they visit. This challenge should be considered carefully to safeguard the integrity of tourism - facilitating a connection between diverse cultures and individuals.

2. Intellectual property and privacy concerns are raised using VR technology in tourism. For instance, reproductions of tourist attractions in virtual reality without clearance may breach copyright laws. Additionally, virtual reality experiences have the potential to obtain personal data from tourists, which is cause for concern regarding data privacy and security. To safeguard visitor rights, it is crucial to establish appropriate regulations and ethical frameworks.

6 Conclusion

Virtual reality is transforming the travel industry through its immersive and interactive experiences, thereby improving the travel experience.

It presents an exhilarating prospect for tourists to explore and understand historical events at significant cultural sites.

However, it is vital to consider the potential drawbacks of virtual tourism. Virtual reality (VR) can indeed provide a comfortable and immersive experience, but it may lack the personal connection and essential human interaction that's quintessential to an authentic travel experience. Tourists may find it challenging to develop emotional attachments to the places they visit due to the absence of physical touch and personal involvement.

Nevertheless, with the implementation of suitable regulations and the consideration of ethical aspects, VR has the potential to offer innovative travel experiences whilst retaining the authenticity and intercultural exchange that provide tourism with its value.

To establish a sustainable and inclusive VR tourism network, tourism organizations, technology providers, and policymakers must join forces to effectively overcome these challenges.

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