



# Virtual Reality in Tourism

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## Abstract

The tourism industry and its customers have been influenced by cutting-edge technology like virtual reality (VR). This research aims to assess the current state of the art in the field of virtual reality (VR) as it relates to the tourist industry. This paper seeks to give a systematic and organised analysis of the state of virtual reality technology as the meaning of the word VR evolves to embrace a wide range of VR systems with varying capabilities. The overarching goal of this study is to further our knowledge of virtual reality (VR) studies in the travel industry.

Researchers and professionals in the tourist industry should pay more attention to virtual reality (VR) because of the numerous practical uses it may have. The quantity and importance of these uses will grow as virtual reality technology advances. Virtual reality (VR) has the potential to revolutionise the tourist industry in at least six distinct but interconnected ways: “planning and management; marketing; entertainment; education; accessibility; heritage preservation”. Creating virtual experiences that visitors would accept as alternatives for actual visits to endangered places is one way in which virtual reality (VR) might be useful as a preservation technique. Tourists' perspectives on authenticity, together with their motives and limits, will influence whether or not they are willing to accept such alternatives. There will be new concerns and opportunities as VR becomes more widespread in the tourist industry. Numerous proposals for further study are provided, all of which would help the industry as a whole.

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## Introduction

The growth of ICTs has had an impact on many different industries, but the travel and hospitality sector in particular. New information and communication technologies (ICTs) help re-engineer systems and processes by having an effect on the tactical, organisational, and theoretical tiers of change (Buhalis & Egger, 2006). Travellers' motivations, booking habits, itineraries, and experiences will inevitably change as a result of these shifts in the industry's management, placement, and promotion of products and services.

According to many sources, virtual reality is a versatile technology that will have far-reaching effects on the future of the tourist sector. It was not until the 1990s that academics began taking an interest in virtual reality's potential impact on the travel industry (Musil and Pigel, 1994; Cheong, 1995; Hobson and Williams, 1995). It wasn't until the 1980s that the concept of Virtual Reality was created, although the underlying ideas may be traced back to the 1930s. Soon after its introduction, virtual reality (VR) was hailed as "potentially one of the most important technological breakthroughs of the late 20th century".



Although it has shown promise, virtual reality is still in its early stages of development. The introduction of more accessible VR technology has stoked interest in virtual travel and spawned a wave of new applications and industries. Tourism marketers may benefit from virtual reality (VR) since it enables them to convey content in a fresh way while still giving guests an authentic experience. With the intangible character of most tourist goods and services, virtual reality (VR) has the potential to enhance the inspiration and information stages of the consumer experience (Wang et al., 2017).

The methods of producing content have evolved and altered. While computer-generated imagery was formerly standard practice, photorealistic 360-degree imagery is now suggested for usage in the tourist industry. Therefore, it is important to assess the state of travel and tourism research (Guttentag, 2010) and give a current viewpoint, taking into account the shifts that have impacted the field of VR in this setting. This paper's goal is to fill in such research gaps by providing a state-of-the-art evaluation that not only takes into account but also classifies and describes various VR technologies. With a fresh take on virtual reality's potential in the tourism industry, this article hopes to advance the field. The authors provide a well-organized overview, industry-specific definitions that account for differences in technical capacities, acknowledge various building methods, and highlight new areas of interest for further study.

### **What is Virtual Reality?**

The word "VR" is often used interchangeably in the academic literature (Dörner et al., 2013). Synthetic experience systems are what this word refers to in a broad sense. But it may also mean a mode of communication analogous to language (Pujol, 2004) or the experience itself (Kim, 2005). Virtual reality is also used to represent the technology in terms of its hardware. Systems with varying essential properties would be lumped together under the same name, which might be misleading given

the fast change of underlying hardware. Scholars have often used the word "virtual reality" (VR) to represent the human urge to leave behind the mundane and mundanely mundane (Ijsselsteijn and Riva, 2003).

According to Slater and Wilbur (1997), "users should forget about the real world and focus instead on the VE. The more advanced the VR technology, the greater the sense of immersion and presence. The degree to which the user is immersed in the VE and to which they participate and interact with it are critical factors in experiencing presence."

### **Modern technology regarding Virtual Reality**

Every VR system requires some kind of input device to let the user to interact with the VE. Motion tracking is often used in virtual reality (VR) systems to establish the user's viewpoint, navigation, contact with objects, and even the movement of an avatar. A variety of input devices, from the basic (mouse, gamepad) to the complicated (fixed, movable arm with a screen at one end), are used in VR systems. Interactive gloves, software that recognizes voices, and wands like those used in Nintendo's renowned video game platform are examples of significantly more advanced technology.

"A user's motion may also be monitored via noncontact tracking devices, such as optical sensors, ultrasonic noise, infrared emitters, or electromagnetic fields attached to the suit at strategic joints." These noncontact devices may entail a single tracker point positioned in one place, like the user's head, or several tracker points dispersed throughout the user's major joints and elsewhere on their body. According to many sources (Burdea & Coiffet, 2003) A VR system will show the user a suitable VE based on the information they submit. Since this visual aspect of a VE is often the most crucial, it stands to reason that it is also the subject of the most study and, thus, has made the most rapid progress (Gutierrez et al., 2008).

Latency, or the time it takes for a user's actions to be reflected in a displayed view, has become more of a priority than picture quality. Eliminating latency (Vince, 2004) has been shown to improve presence and prevent motion sickness in virtual environments. Many VEs are carbon copies of real-world landmarks or attractions, and this trend is likely to be much more pronounced in the tourist industry.

Laser scanning and photogrammetry are the two main techniques for creating a 3D digital model of an existing thing. Data sets defining the geometric shape and colour of an object can be recorded by laser scanners, while the acquisition of such data from photographs can be referred to as photogrammetry (Addison, 2000). These two methods are often employed together (e.g., Beraldin et al., 2002) and have allowed for more efficient and accurate data collecting (Addison, 2000; Powell, 2009). While certain 3D imaging technologies, such as laser scanners, remain prohibitively costly, others are available for free on the Internet.

### **Future virtual reality technology**

There's little doubt that VR systems will get better at stimulating all five senses as the technology develops. Further, user interaction with VR systems is expected to develop significantly beyond the present-day input and output devices. It is hard to predict precisely what the future of virtual reality will be like, but by looking at current projects in the field, we may get a sense of what the future of VR could hold. For instance, the NAU international design collective is working on a "Immersive Cocoon" (Immersive Cocoon, 2009; Tutton, 2008) that will utilise motion-sensing software for data input, a human-sized dome with a completely encircling screen, and surround sound music. Another example is the 'Virtual Cocoon' being developed by a group of British academics; "it is a headset that can stimulate all of the senses by utilising high-definition graphics, surround sound, temperature and humidity controllers, an olfactory display, a device that can spray

flavours into the mouth and provide texture sensation, and a separate glove that provides tactile feedback" (Derbyshire, 2009; Engineering and Physical Sciences Research Council, 2009; Madrigal, 2010).

Future advancements in virtual reality (VR) look likely to be tied in with research into interfaces between brains and computers (BCIs), in which the brain communicates with a computer via invasive or non-invasive technology. Since the initial experimental demonstration in 1999, researchers have made tremendous progress with non-invasive BCIs. This is due to the fact that intrusive methods are virtually often used for therapeutic ends. Agence France-Presse (2008) reports that one disabled guy who worked with academics was able to control an SL avatar using just his thoughts. Specialised hardware in the form of three electrodes monitoring his brain waves allowed for this. Two people played a Pong-like game using brain signals, while three healthy students navigated a simulated street using brain signals.

### **VR in tourism – a comprehensive overview**

It has long been understood that virtual reality (VR) has the potential to completely transform the travel business. Virtual digital worlds are becoming more important to the tourism business as they pervade the everyday lives of visitors. Planning and administration, marketing and information exchange, entertainment, education, accessibility, and historical preservation are just few of the many uses of virtual reality (VR) in the tourist industry.

According to Carrozzino and Bergamasco's (2010) classification of virtual reality (VR) systems, non-wearable devices are more immersive since they are less intrusive than wearable ones. Because of this, virtual reality (VR) systems, including cave automated virtual environments (CAVEs), are seen as more immersive than head-mounted displays (HMDs). Carrozzino and Bergamasco's (2010)

claims are not well supported by the existing research.

### **Semi-immersive VR in tourism**

From this literature research, we offer what follows definition of semi-immersive VR for use in the tourist industry: In order to create multiple users virtual popular experiences which stimulate one's sense of sight and possibly additional senses for the goals of organising, overseeing, marketing, communication of information, entertainment, education, access, or heritage preservation, semi-immersive augmented reality (siVR) makes use of large-screen tracks or walls. and, if desired, the floor of an area to project artificial or 360-degree practical captured content. This review focuses on the years 1998-2014, when the majority of relevant studies were published. The researchers discovered that distinguishing niVR from siVR is not always easy. According to Groß (2015), a multi-category assignment is conceivable since it may be impossible to explicitly assign each item using a categorization technique.

The majority of the examined research on siVR focuses on practical implementations for the exhibition or preservation of historic sites. Virtual 3D reconstructions of locations are the main focus of Pantano and Servidio's (2009, 2011) research on ubiquitous environments. Researchers discovered that research participants wanted to see the genuine thing for one key reason: to check on the accuracy of the reconstruction. Those who tried out siVR agreed that it had advertising potential and was preferable to conventional guides with static material (Pan-tano and Servidio, 2011). Both the interactivity of the siVR technology and the clarity of the 3D visuals were praised. The research by Loizides et al. (2014) confirms this, "contrasting a semi-immersive VE with a fully-immersive VE in a museum setting. Therefore, Pantano and Servidio (2011) draw the inference that photo quality, user friendliness, and interaction mode are crucial for the effective delivery of digital tourist data."

### **Fully-immersive VR in tourism**

When discussing VR for tourist purposes, the following criteria must be met: The public and private sectors are able to profit from "fully-immersive virtual reality (fiVR) by providing synthetic or 360-degree real-world captured content with a VR headset, allowing for full visual immersion and enabling virtual touristic experiences that potentially stimulate additional other senses of the user" for the purposes of management, marketing, communication of information, entertainment, education, accessibility, or heritage preservation.

"The use of fiVR in tourism promotion is now trending. Although several studies have shown that fiVR is an effective tool in tourist marketing, Tussyadiah et al. (2016) find that traditional trip guides are more effective than fiVR experiences." Numerous studies suggest that this may boost interest in the destination, alter people's perceptions of it, and influence them to plan a trip there. Marchiori et al. (2017) bolster this idea when they discuss how fiVR may pique interest and encourage viewers to check out a promotional experience in the tourist industry.

Similarly, Beck and Egger (2018) discovered that the vast majority of people in their survey agreed that fiVR was the way forward for tourist advertising. Compared to promoting the location on a website with static photographs or 2D movies, promoting the location in VR increases the desire to share the marketing experience with others or suggest the place (Gryphon et al., 2017). Further, it is suggested (Beck and Egger, 2018) that VR material tailored to a certain audience may have a significant impact on how they feel and what they ultimately decide to do.

### **Major findings, recommendations and future perspectives**

Virtual reality (VR) is quickly becoming a source of new tourist experiences aimed at informing,

entertaining, educating, making accessible, and preserving heritage. Concurrently, the evolution of virtual reality technology opens up windows of opportunity for destinations, hospitality businesses, and attractions at every stage of the consumer life cycle.

This state of the art review makes a contribution to theory and practise by, among other things, classifying VR systems into a new category and suggesting specialised definitions for their application in the tourist industry. This study's results will provide a foundation for future research in the field and a roadmap for VR's practical use in the business world by illuminating the core features of niVR, siVR, and fiVR.

### Conclusion and limitations

This study provides a thorough analysis of the current status of virtual reality tourism research. It adds to the existing body of knowledge by proposing a unique categorization of virtual reality (VR) in tourism into non-immersive, semi-immersive, and fully-immersive modalities, as well as definitions for each. The field of virtual reality is only getting started. There are a number of obstacles in the area of application right now, and there are also a number of holes in the literature that need to be filled. Rapid advancements in virtual reality technology and their expanding range of applications highlight the need for further study in the sector of tourism. This article has helped advance our understanding of the role of VR technologies in the tourist industry and how they may be used at every stage of the customer lifecycle.

In this regard, "it has been apparent that although research has been conducted concentrating on the impacts of VR during the pre-travel and on-site phases, research examining the deployment of VR in holistic marketing strategies and the post-travel phase is sparse. As virtual reality (VR) technology advances, studies should be performed to

provide best practises for using it to business objectives."

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