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Virtual Reality and Tourism: Will the Future of Travel be Virtual?

Juleigh Giberson

Tom Griffin

Rachel Dodds



Institute for
Hospitality &
Tourism Research

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Additional information about the authors:

Juleigh Giberson is a research assistant at the Hospitality & Tourism Management Institute at Ryerson University, and a final year student in the Bachelor of Commerce, Hospitality & Tourism Management program. She has co-authored three papers on Virtual Reality, one of which was the recipient of the Best Paper Award at the 2017 Tourism & Sports Management Division at the Administrative Sciences Association of Canada Conference and one a finalist for Best Paper Award at the 2017 Travel & Tourism Research Association International Conference. She has also conducted her own research on Gen Y and VR, presented at the 3rd Global Hospitality & Tourism Conference in Hong Kong.

Rachel Dodds, Ph.D., and Tom Griffin, Ph.D., are professors in the Ted Rogers School of Hospitality and Tourism Management at Ryerson University.

Abstract

Virtual Reality (VR) is anticipated to impact people's personal and professional lives at an increasing rate. With the cost of fully immersive VR systems declining, the technology has been penetrating more industries, and innovative implementations continue to emerge across a variety of fields. The implications of VR for the travel and tourism sectors are substantial. VR can bring a distant place or activity to people for marketing purposes or because of accessibility issues, and can educate visitors in real time while visiting a tourist site.

Additionally,

- It has been anticipated that 200 million VR head mounted displays (HMD's) will be sold by 2020 (Gaudiosi, 2016)
- VR is already being used by destination marketing organizations (DMO's), cruise lines, airlines, tour operators, hotel properties and more
- Academic studies assessing the impact of VR on tourism are becoming more prevalent

Yet, there are some concerns around VR for the travel industry regarding the possible threat of replacing the need to travel for certain experiences as the technology improves. Ultimately, travel marketers should carefully curate their content by including activities that take advantage of the technology by showing impressive viewpoints and interaction with the destination while encouraging actual visitation. What is clear, with an upward sales trend and increasing popularity, is that VR is a force to be reckoned with, and one that the tourism industry must be aware of.

Virtual Reality and Tourism: Will the Future of Travel be Virtual?

Welcome to the world of Virtual Reality (VR), an innovative technology which can be defined as a method of transporting a person to a new environment in which they are not physically present but feel as if they are present and immersed through the stimulation of multiple senses (Bordnick, Carter, & Traylor, 2011; Guttentag, 2010). Years ago it might have seemed unimaginable, yet in 2017 the technology is becoming more mainstream, and is expected to affect people's lives at an ever-increasing rate. Already a billion-dollar industry with an upwards trajectory (Merel, 2017), VR is quickly becoming a technology of interest for a wide range of sectors.

The use of VR is already making an impact in a variety of fields, from medicine (Robison, Liu, & Apuzzo, 2011) to the military (Rizzo et al., 2015). With an anticipated 200 million VR head mounted displays (HMD's) to be sold by 2020 (Gaudiosi, 2016), everyone from marketers to musicians seems to be implementing the technology into future plans. Whether using it to communicate brand messages, or just communicate with fans, VR is being used throughout industries worldwide, and tourism is not immune.



Photograph by Combat Camera Operator, Sgt. Austin Berner, 2013

Within the tourism industry, VR has been a growing topic of interest for both researchers (Balogun, Thompson, & Sarumi, 2010; Fauzi & Gozali, 2015; Griffin et al., 2017; Guttentag, 2010; Tussyadiah, Wang & Jia, 2016) and reporters of travel (Kressmann, 2017). While some have considered the possible threat VR can pose to the industry as a substitute for travel or replacement for real life travel guides (Cheong, 1995; Pedrana, 2014), many have embraced it, developing various applications and activations centered around the technology, which will be discussed further in this paper.

The ability for VR to transport people to a new environment in which they are not physically present, but feel as if they are present and immersed, is of great interest to travel marketers who are continuing to develop ways to reproduce destinations and promote a positive destination image (Lee et al., 2017). As tourism experiences are often difficult to communicate, immersive VR technology is an appealing medium for destination marketers, and many have started to produce and distribute VR content. This paper will consider the definition of VR and highlight how travel organizations are currently using the technology, honing in on the use of VR for tourism marketing.

What is Virtual Reality?

The concept of VR may seem simple, but it can cause confusion, especially when understandings vary widely. Many proposed definitions encompass different levels of technology and immersion. For some, VR is a broad term (Guttentag, 2010), and can be used to define a range of experiences from the use of computer-generated three dimensional (3D) environments on a personal desktop computer to a fully immersive experience using a head mounted display (HMD). An example of a computer-generated 3D environment is online virtual world Second Life, where users can create avatars (an online character representation of themselves) and hang out with friends, play games and visit cities (Kalning, 2007). Others disagree, stating that VR is a unique and immersive experience that cannot be achieved through simple 3D interactions on a desktop computer (Gutierrez-Maldonado, Wiederhold, & Riva, 2016). While some stipulate that VR simply has to stimulate one or more of the user's five senses (Guttentag, 2010), others state VR must at the very least provide immersions of vision, sound and touch (Desai, Desai, Ajmera, & Mehta 2014).

Though definitions may differ, they all broadly agree that VR is a way of transporting a person to a new environment in which one is not physically present but feels as if they are immersed in the virtual place.

Augmented Reality vs. Virtual Reality

Augmented Reality (AR) comes up often when discussing VR. AR could be considered an extension or variation of VR (Milgram, Takemura, Utsumi, & Kishino, 1994). While VR technology completely immerses users in a synthetic world, AR technology superimposes virtual objects and cues upon the real world in real time. (Carmigniani et al., 2011).

AR is generally less expensive to implement than VR, and has gained recent mass exposure through the popular Pokemon Go app. Pokemon Go is a game which uses a player's smartphone's global positioning system (GPS) and augmented reality. Players view their device screens which show the real world around them as either a map or the immediate environment shown through the camera. However, the app places characters, or Pokemon, in actual places in the real world, and players can hunt these virtual creatures for points (Lee, 2016). Additional applications of AR that have become widely recognized include Google Translate, in which photos taken of text can be translated in real time, and Snapchat, which uses AR technology to allow users to overlay 3D stickers (or filters) over their faces in real time. Several forecasters predict AR will become even more popular than VR (Azuma, 2016).



Photograph by Amber Case, 2010

VR Content and Hardware

VR content can be produced using computer science (3D programming languages and graphics) or, especially for VR experienced through an HMD, through the use of cameras. 360° video content can be “stitched” together from several conventional video streams or created in full using specialized VR cameras.



Photograph by Joachim Laatz (2017)

VR hardware can be described as the platform or interface in which VR content is consumed or experienced. A more immersive VR experience involves the use of a HMD, a device in which users can experience 360° video content, often designed as a helmet or goggles, and worn on the head. HMDs provide visual depth as users generally have one display screen for each eye, and some, like the Oculus Rift, include a sound system and motion tracker, which mimic a real-world experience (Lee et al., 2017). Using a HMD allows one to look up, down, and all around, adding a visual richness not attainable with more traditional platforms, like standard two dimensional (2D) videos or photos. Currently, virtual environments created through a computer offer opportunities for the user to navigate and choose which areas to visit. VR content created with video allows users to look around, but their position within the virtual environment is fixed.

The top HMD devices in terms of shipments in 2016 were Samsung Gear VR, Sony PlayStation VR, HTC Vive and Facebook’s Oculus Rift (Kamen, 2017).

The Evolution of Immersion

Despite recent developments, VR has actually existed for several decades. The term “Virtual Reality” was coined in 1987 by Jaron Lanier, a researcher; however, there are several antecedents that go back to the 1930s. Stereoscopes can be considered some of the first instruments which paved the way for modern day VR. These optical instruments display two pictures of the same object, taken from slightly different points of view, which are viewed one by each eye, producing the effect of a deeper single picture of the object. William Gruber’s stereoscope, View Master, created in 1939, has been said to have set the foundation for the design of modern day VR viewers, like Google Cardboard (History of Virtual Reality, 2016).



Photograph by Dave Pape (2006)

The level of immersion continued to evolve with Morton Heilig’s Sensorama (1950s), an arcade-style theatre cabinet which stimulated all five senses. Morton Heilig also developed the first HMD, the Telesphere Mask, in 1960.

HMDs have since evolved since the Telesphere Mask, which was powered through miniaturized TV tubes (Brockwell, 2016). Today’s HMDs are based around three main platforms: desktop computers, (e.g., Oculus Rift, owned by Facebook); computer consoles, (e.g., Sony’s PlayStation VR), and VR Viewers, or headsets into which mobile phones are inserted (e.g., Samsung Gear VR, Google Cardboard and Google’s Daydream). Non-immersive VR content can

be viewed through a smartphone without a HMD. This usually involves the activation of one or two senses, as 360 videos can be viewed through tilting or touching one's smartphone or tablet. Other VR devices, mainly in the form of mobile supportive devices allow consumers to use their smartphones without purchasing specialized screening technology (Sjöström, 2015). For instance, Samsung Gear VR and Google Cardboard are powered through the user's smartphone.

As technology develops, the sensory experience can become even more stimulating. For example, Facebook-owned Oculus Rift has been working on 'next-generation' hardware - unveiling wireless gloves to let users see and use their own hands in virtual worlds (Xinhua, 2017). A researcher at the University of Singapore has developed an HMD accessory, the Ambiotherm, which incorporates atmosphere into the VR experience by simulating wind and temperature (Revell, 2017).

It has been predicted that the technology will be consumer mainstream within five years (Barnes, 2016) with worldwide AR/VR spending anticipated to reach \$13.9 billion in 2017 and \$143.3 billion in 2020 (Ng, 2017).

From innovative but modest beginnings, VR technology has recently become both more advanced and accessible. Products such as Google Cardboard, a basic HMD available for around \$20, work with almost any smartphone, and the experiences available are becoming more immersive and exciting. As these two trends continue, it is likely that more and more people will have greater access to an ever improving technology, both in the home and at specialized outlets.

Virtual Reality and Tourism

There is huge potential for VR in the hospitality and tourism sector, and applications of VR technology are growing. Resorts, hotels, destination marketing organizations (DMOs), theme parks, and airlines are just some of the businesses tapping into the technology. Guttentag (2010) identified six ways in which tourism will be affected by VR including planning and management, marketing, entertainment, education, accessibility and heritage preservation. Industry has primarily focused on implications of VR in tourism including marketing, accessibility, education and entertainment, which will further be discussed in this paper.

Marketing

One of the most prominent implementations of VR in tourism is in marketing. The intangible and inaccessible nature of tourism experiences present challenges for both providers (in convincing travelers to actually visit a destination) and consumers (in making a decision on where to spend a vacation). Immersive Virtual Reality gives travel marketers the opportunity to provide potential consumers with the most realistic experience of a destination without necessary physical co-location (Barnes, 2016). When used as a marketing tool, VR can help convey experiences, increase awareness and purchase intention (Huang, Backman, Backman, & Chang, 2016; Klein 2003), as well as potentially boost destination image (Griffin et al., 2017). VR can also help a destination gain competitive advantage, which is increasingly important as destination choices available to consumers continue to expand (Echtner & Ritchie, 1991; Jung & Han, 2014).

Although adoption of VR is still relatively cutting edge, industry is catching on and integrating VR elements into their marketing. For example, Carnival Cruises is using 360-degree video technology to give potential buyers a clearer picture of what to expect and regain control of travelers' preconceived notions of a trip (Rizzo, 2016). In fact, a broad array of organizations within the hospitality and tourism sector are using 360 video for promotional purposes including Hilton Hotels (Samuely, 2016), Qantas (Hayes, 2016), and Tourism Australia (Al-Obaidi, 2016), among many others. The VR medium is a platform that can offer users a "try before you buy" experience. Etihad Airways has developed a VR video in which consumers can get an up-close look at the flying experience, and at Australian actress Nicole Kidman, who stars in the campaign (Dawson, 2016).



Virtual Berlin 3D Oculus Rift Virtual Reality, Photograph via maxpixel

In addition to creating 360 content, promotional campaigns built around VR experiences using HMDs have been implemented. At the 2016 Hotelympia exhibition, the United Kingdom's largest foodservice and hospitality exhibition, visitors were able to enjoy a walk-in immersive VR experience, exploring the newly-built Hilton Bankside hotel in London and appraise the ambience (Vitaliev, 2016). Marriott hotels set up a VR brand activation in New York outside City Hall. They wanted to provide newlyweds the opportunity to teleport to honeymoon destinations, like their exotic beachfront resort in Hawaii (Jawbone Brand Activations, 2017). Additionally, the Tourism Australia website saw increased engagement of 64% after the launch of their VR campaign on Facebook (Canning, 2016), demonstrating consumer intrigue and interest in the technology and opportunities it offers.

The impact of VR in travel marketing is still nascent, and few examples of the implications of these immersive campaigns exist. However, academic studies measuring the actual impact of the technology are becoming more prevalent. Tussyadiah, Wang, and Jia (2017) confirmed the effectiveness of the VR experience for marketing in a study involving a virtual walkthrough of tourism destinations using 202 participants. HMDs including the Samsung Gear VR and Google Cardboard, provided participants with a VR tour of either Tokyo, Japan, or Porto, Portugal. The authors found the high degree of spatial presence that VR offers lead to stronger and more positive interest toward the destinations viewed. VR can also positively influence the image people have of a destination. In a study conducted by Griffin et al. (2017) three groups of people were asked to examine marketing materials on South Africa using either VR, a video on a computer, or a website. Those who viewed the VR developed positive

emotions towards South Africa as a place to visit, and were much more likely to want to tell other people about both the marketing material and the destination. Hyun and O'Keefe (2012) found that information displayed through VR on Tasmania as a destination positively influenced conative image, which could translate into purchase intention. Although VR is still seen as a bit of a niche technology in North America, the technology is much closer to being mainstream in places like China, where VR cafes, kiosks and arcades are becoming more prominent. Destinations like Los Angeles are taking note, developing VR footage of popular attractions to target and lure Chinese millennials to the City of Angels (Joco, 2017).

Accessibility

VR increases the accessibility of destinations, allowing travelers to virtually visit and experience places and activities that are available to the public or unattainable due to financial or physical limitations. VR can remove some of the barriers to travel, including safety, cost and physical capabilities. For example, the recently launched Google Earth VR can take users on a 3D visit almost anywhere from Table Mountain in South Africa to glaciers in Argentina (PTI, 2017). Another recent application, Facebook Spaces, unveiled in spring 2017, allows users to visit exotic locations alongside friends through the Oculus Rift HMD (Fitzsimmons, 2017).



Photograph from Samsung Newsroom (2017)

Though it may not be as good as the real thing, VR can allow tourists to visit sites that may be too remote, too expensive, too inhospitable, too dangerous, too fragile, or that simply no longer exist (Najafipour, Heidari, & Foroozanfar, 2014). For example, the life-threatening risks that come with trying to reach the summit of Mt. Everest can now be avoided, and the task achieved from the comfort of one's home (Steyn, 2017). SpaceVR is a company specializing in virtual space tourism, and has signed an agreement to launch the world's first VR camera satellite into space, providing consumers a view from orbit (Anderson, 2016). Additionally, VR has been hailed as a potential tool for preservation as visitors are able to immersively experience destinations without physically impacting the area. According to Wiltshier and Clarke (2016), the use of technology to view special sites can offset the depredations of the large numbers of visitors that destroy the item. In the instance of the Chinese village of Dai Ethnic, the design of an interactive virtual experience allows tourists to be immersed in the cultural heritage without threatening the community's survival (Peng, He, & Huang, 2015).

Devices are also being created to help provide opportunities for people unable to move or with or disabilities to visit places that may not otherwise have been accessible. VR Wonders of the World is a series that provides residents of a British Columbia retirement community the opportunity to experience far-off lands and experiences from their past. As one resident said, "My husband and I used to mountain climb and hike places like Strathcona Park on Vancouver Island. I can't hike anymore, but it's very heartwarming to see this. I think it's wonderful that people can see these places even if they can't get to them." (Thomas, 2017, para. 4). The implications of VR are substantial, as the benefits of travel that people experience, such as enlightenment, well-being, education, and nostalgia, can be more easily accessed by a wider variety of people who would otherwise miss out.

Education

VR applications can provide an enhanced platform for the transfer of knowledge. In the field a tourism, VR mobile applications can be used to bring the history of destinations to life. 'Ancient Jerusalem VR', an app developed by the University of Melbourne's Simon Young, allows users to view 360 stages of ancient Jerusalem using their smartphone (Butt, 2017). Tourists can learn about the history of Olympia or stroll through Paris using mobile AR applications (Etxeberria, Asensio, Vicent, & Cuenca 2012; Hutchings, 2013).



Photograph by Kippelboy (2012)

AR and VR applications can be used by tourists in real-time, while interacting in an environment. The technology can help in terms of increasing the visitor's knowledge of destination's history and culture, but also to become aware of services and attractions that are available during the trip. Jaipur, India is anticipated to establish VR kiosks for short-stay travelers, who may not have the time to visit in person, to allow them to virtually explore and walkthrough famous monuments (Chaudhary, 2017). VisitScotland's new VR app allows prospective visitors to view 26 Scottish attractions around the country (Hart, 2017). These applications of VR are well suited to assist tourists to explore a destination during their stay, as well as suppliers of goods and services (merchants, transportation and cultural heritage sites) who have information to share, promotions to announce and advice to offer (Linaza et al., 2012). Another example is Tuscany+, an AR application that offers an interactive, real-time guide to enhance one's trip with four categories of information: sightseeing, accommodation, dining and entertainment (Linaza et al., 2012).

Fun and Entertainment

VR systems also can function directly as marketable, entertaining, standalone tourist attractions (Guttentag, 2010). Disney theme parks are investing more in projection-based AR attractions to offer a novel experience to their visitors (Mine, Van Baar Grundhofer, Rose, & Yang, 2012). A good example of projection-based AR is in Disney's famous Haunted Mansion ride, for instance, using projection technology to place a ghostly head inside a crystal ball (Mine et al.) Another example is Joy Land, a Chinese theme park that offers an AR game, Soul Hunter, where visitors enter a haunted house and walk through playing a live video game. This in itself has become a popular tourist attraction (Weng, Xu, Li, Wang, & Liu, 2011). The Karnataka tourism department in India is targeting fans of the famous Bollywood film, Sholay, with plans to create a virtual reality village in the Ramanagram district where the film was shot that will put visitors in scenes from the movie (Madhukalya, 2017).

Apart from creating new VR attractions, Virtual Reality is also being used to enhance existing attractions through the creation of a virtual experience that adapts to an already existing environment, and theme parks are a great example (Bulencea, 2016; MacDonald, 2015). On the Drop of Doom ride at Six Flags New Jersey, visitors can battle giant mutant spiders while plunging to Earth. Riders strap on a Samsung Gear VR and are transported to a world under attack from large arachnids while travelling at speeds up to 145 km an hour (WABC-TV, 2017). Other theme parks are also getting in on the VR action.



Photograph by David Castor (2016)

Adoption of VR isn't just limited to theme parks; museums and art galleries are also using VR to incorporate fun and drive traffic, where the technology has been used to gamify exhibits (e.g., the Museum of Fine Arts in Boston, MA (Bulencea, 2016)), and as a medium through which art is presented (e.g., the Palazzo Ducale in Venice). VR can provide a museum or gallery with a point of differentiation and competitive edge (Izzo, 2017), and offers an engaging form of 'edutainment' (education through entertainment).

VR Critique

Though this paper has outlined some of the ways VR has advanced the hospitality and tourism industry, there are also some critiques of the technology worth mentioning. From a physical standpoint, VR can cause simulation or motion sickness, a result of the combination of visual and vestibular (inner ear and brain) stimulation (Pappas, 2016). From a social standpoint, the potential for VR to encourage an unhealthy amount of escapism, or avoidance of the real world is a serious concern (Kim, 2015). Spending too much time in a virtual world can be socially isolating, dangerous and unhealthy (Kim, 2015). There is a real need to be considerate of these issues. For tourism destinations, the need to provide compelling reasons for visitors to actually travel, visit, and experience the places, people, and culture in real life is important. This is important not just for the well-being of the communities who receive tourists who benefit from the cultural and economic gains, but also for the broader connection that quality tourism can foster between people from different parts of the world.

Conclusion

Virtual Reality is increasing in popularity and capability, and with this, the implications for hospitality and tourism evolve. As an emerging topic of interest, many have considered the possible ways VR can propel the industry forward. Though a variety of applications have been, and continue to be developed for tourism, destination marketing has emerged as a prominent activation.

Though VR has been discussed as a tool for tourist education, exploration and entertainment, the potential impact on destination marketing is perhaps the most significant. It is interesting to note that VR can be viewed as a double-edged sword; there are immediate opportunities for marketing intangible tourism products to distant potential visitors, but there are also concerns for the detrimental impacts that VR may bring in the future. The current VR technology does not appear to offer significant challenges to the demand to visit real places, and in fact offers enhanced opportunities for marketing. But as the technology evolves in the coming years, tourism destinations and operators would be wise to ensure there are compelling reasons to actually visit the real place, and promote the distinctions from other experiences that may be replicated in the virtual world. For the time being, however, rather than be concerned with VR offering a travel replacement, DMOs and marketers of travel are instead using the technology to highlight destinations, hotel properties and attractions in hopes of encouraging real life visits.

There are also implications for destinations with fragile sites to adopt VR experiences to help relieve the pressures of overtourism and the damage it can bring.

Though many examples have been identified in this paper, in terms of academic research, there is still little empirical work regarding the use of VR in tourism marketing. It is therefore difficult to truly predict yet how consumers will adapt to the increase use of VR in travel. Though it is highly likely that more and more travel brands continue to integrate VR into their marketing campaigns in the future.

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