TOURISM IN DIGITAL AGE: AN EXPLANATION FOR THE IMPACTS OF VIRTUAL, AUGMENTED AND MIXED REALITY TECHNOLOGIES ON TOURIST EXPERIENCES

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Abstract

The purpose of this study is clarifying effects of reality technologies on tourist experiences. For this purpose, tourist experiences and reality technologies are defined firstly. Thereafter, examples are given for the virtual, augmented and mixed reality applications within the tourism sector. In the last section, some evaluations are made for the future tourist experiences. In this study, it is concluded that virtual and augmented reality technologies are mainly used in museum tourism and have a positive effect on visitor experiences. In addition, it's suggested that future tourist experiences will be more conscious because of raise awareness with diffusion of augmented and virtual reality technologies in all tourism sector.

1. INTRODUCTION

Nowadays, digital technologies affect the tourist experiences than ever before. In particular, virtual (VR) and augmented reality (AR) technologies influence them. According to the early conceptualizations of tourist experience, it only relates to being a temporarily leisure person (Uriely, 2005), but it connects to the virtual or augmented reality today. These technologies change the definitions and discussions about tourist experiences both de facto and conceptual level. It's hard to reveal effects of VR and AR technologies on tourist experiences by reason of their intangible nature. Virtual Reality (VR) can be qualified as a computer generated three dimensional environment (Guttentag, 2010) in tourism. Augmented Reality (AR) is enrichment of real environment with voice, scene, graphic and GPS data that produce by computers or ICTs. Also, these technologies are mostly combined each other and

created mixed reality (MR). In brief, VR provides virtual world instead of your real world, but AR interacts both real and virtual world. AR adds to some virtual things in your actuality for instance augmented reality GPS. We can interact with created augmented reality via to mobile phone, tablet PC etc.

In recent years, virtual and augmented reality technology applications become popular in tourism. It's difficult to understand these technologies how to operate because of their complex structure, but our focus is their implementation in tourism sector. In general, studies in related literature discuss examples of using these technologies in museum visits, also heritage tourism. Shortly, these kind of studies are usually included in the scope of cultural tourism. Besides, virtual and augmented reality technologies are also used for the theme parks, gaming, booking, restaurant, hotel experiences, transportation, destination marketing and browsers in destination etc.

This paper seeks for answer that question "how do virtual (VR) and augmented reality (AR) technologies influence tourist experiences?" For this purpose, tourist experiences and reality technologies are defined firstly. Virtual and augmented reality applications using in tourism sector take part in second section. In the last section, future tourist experiences are evaluated in the context of using these technologies.

## 2. AN EXPLANATION FOR TOURISM EXPERIENCES AND REALITY TECHNOLOGIES

The conceptualization of tourist experiences has been a key research topic since early 1960s. These early conceptualizations accentuate its distinction from daily life. Yet, studies have been arisen challenge to the idea that tourist experiences have been quite different from everyday life routine since 90s. For example, Lash and Urry (1994) define decreasing differences between day-to-day life and tourist experiences as ''the end of tourism''. According to Lash and Urry (1994), today experiences which limited the tourism are accessible under favour of mass media, video and virtual reality technologies (Uriely, 2005: 199-203). In this regard, impacts of virtual and augmented reality technologies in tourism are supposed to discuss based on the "end of the tourism". Because they change the nature of tourism activities. Especially, they alter the museum, heritage, cultural tourism experience characteristics. Therefore, it cannot be afford to overlook that as mentioned by Tung and Ritchie (2011) we cannot reach consensus for the definition of tourism experiences. But, it's clear that service delivery has been turned into experience creation day by day. Focus shifts to emotional, physical, spiritual, and/or intellectual level of individuals. According to the Tung

and Ritchie (2011), four experiences areas are defined as entertainment, educational, esthetic, and escapist in the literature (Tung and Ritchie, 2011: 1368-71). Thus, it can be stated explicitly that tourism experiences have been evolved from being only satisfactory to more memorable.

Reality applications using in tourism can be split into 3 groups as virtual (VR), augmented (AR) and mixed (MR) reality. Primarily, as Guttentag (2010) mentioned that VR technologies are notable for management and planning, marketing, entertainment, education, accessibility, and conserve the cultural heritage in tourism sector. For instance, virtual reality provides opportunities for tourism planners or managers to analyse possible developments with realistic and navigable virtual environment. By this means, it's possible providing inputs for the plans from an appropriate groups or other community members (Guttentag, 2010: 640-41). If we see the destination in virtual platforms, also can affect the experience of tourists. For this reason, it can be said that VR technologies also impact marketing strategies within the tourism sector. Besides, examples are increased by using VR-types technologies such as augmented or mixed reality. It's clear that these kinds of technologies are used more sophisticated from day to day in tourism, and so it's impossible to distinguish their usage areas from each other.

Despite a great variety of examples, boundaries between using these kinds of technologies and tourist experiences haven't been clearly specified by researchers (Flavián et al., 2019).

Figure 1. Reality-Virtuality
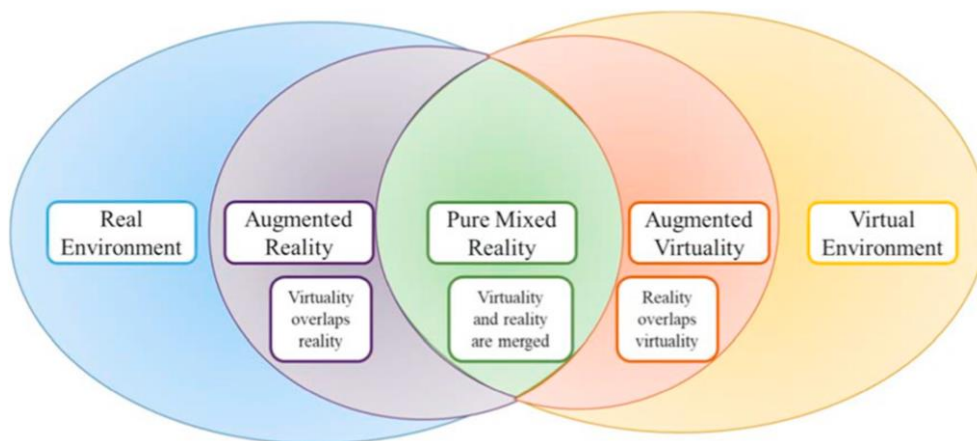
Source: Flavián et al., 2019: 549.

Figure 1 proposes a plain explanation of reality-virtuality. Two main areas are situated above real and virtual environment. Main feature of Virtual reality is that users are placed in completely digital world (PC World, 2017 cited by Flavián et al., 2019: 549). In augmented virtuality, computer-generated imagery that can be manipulated by the user, and he/she is still completely in virtual environment. However, augmented reality is the combination of real and computer generated imagery in real time, and digital images or video are joined the real world. On the other hand, the stimulated objects in mixed reality can interact with the real environment such as a ball bouncing off the wall or new furniture rearranged in the room (PC Encyclopedia, 2019).

Table 1: Differences between the Reality and Virtuality

	Real Environment (RE)	Augmented Reality (AR)	Pure Mixed Reality (PMR)	Augmented Virtuality (AV)	Virtual Environment (VE)
The main environment is the virtual world (V) or the real (R) world.	R	R	R	V	V
Users interact with the virtual (V), real (R) or both (R-V) worlds in real time.	R	R-V	R-V	R-V	V
Digital content is superimposed on the real environment.	-	√	-	-	-
Real content is superimposed on the virtual environment.	-	-	-	√	-
Digital content is merged into the real world so that both digital and real content can interact in real-time.	-	-	√	-	-

Table 1 summarizes differences between reality and virtuality. According to this, pure mixed reality, augmented reality and virtuality interact both real and virtual world.

3. THE VIRTUAL, AUGMENTED AND MIXED REALITY APPLICATIONS IN TOURISM

Digital Tourism Think Tank's "*Augmented Reality in Tourism*" Report presents some highly innovative AR experiences to us. For instance, Saint Petersburg Clearwater Bureau offer one's experiences called as "Two Treasures 3D Tour to customers which is also used for booking. This virtual tour guide provides convincing and interactive preview of the world

famous beaches and museums. In another example, AR smartphone applications (e.g. Yelp Inc.) lend hand to vacationists when they are in unfamiliar locations (Digital Tourism Think Tank, 2019). Well, a tourist booked and arrived in his/her destination by using AR technologies or apps, after that she/he maybe wants to have fun or eat something. For example, he/she decisions to have fun. There are many AR outdoor game applications for him/her. Time Warp is interesting examples of outdoor games which developed by researchers at the Applied Information Technology Institute in Germany. Games allow tourists to walk around the city of Cologne in Germany, "jumping" through time portals and experiencing different historic and future events (Digital Tourism Think Tank, 2019). After this exciting experience, vacationists want to eat something may be. This once, let assume that aforesaid tourist group is in London. For instance, The Inamo restaurant offers some services provided by projective AR technology. By this way, customers able to choose their own table theme, order something from multimedia menu or watch live video from kitchen (Digital Tourism Think Tank, 2019). Apart from this, AR technologies are used in several area within the tourism sector. For example, digital storytelling technics are implemented in museums. Visitors are accompanied narrator voice and music. Thus, visitor retention time and return visits increases. Digital Binocular Station is an important example of this technologies and it makes the static contents of a museum. In short, we can increase the number of application examples for different tourist groups (Digital Tourism Think Tank, 2019).

In recent years, tourism research have increasing attention for human interacts with technology, especially in cultural tourism. Many studies in the literature generally examine the museum visits, because virtual; augmented and mixed reality technologies are adapted in museum easily. For instance, Trunfio and Campana (2019) proposes a conceptual model for user experience in the Ara Pacis Museum, Italy. First of all, the study concludes that integration between museum heritage, physical components and mixed reality created memorable and unique experiences. Also results affirm the role of the museum as an immersive cultural site. In addition, it's emphasized that the human and technology interaction in the museum is important for conserve the cultural heritage, virtual accessibility and culture diffusion, and also for sustainable local development. According to the Falk and Dierking (1992, cited by Galani, 2003:1), interactive museum experience are affected by three ways such as the physical, personnel and social context mainly. In addition to this, Han et al. (2018) identified core elements of affecting the visitor experiences as attention, involvement, engagement, immersion and cognitive absorption. Generally, these elements are related to the personnel context of tourist experiences. Yet, museum or cultural visits are usually associated

with social context despite of including some kinds of personnel elements. On the other side, previous studies on social context focus on experiences take place in physical design of museum. Also, researches investigate experiences which are shared between local and remote visitors. Remote visitor who visits a museum with technological opportunity such as internet (Galani, 2003: 1-2). According to the Galani (2003), reality technologies are bridge between physical and digital environment and also local and remote visitors. Remote visitors can give some information to local visitors during the tour and so these interactions constitute social dimension of museum visits. Jung et al. (2016) examine the effects of virtual and augmented reality on overall museum visitor experience in terms of social presence and the experience economy theory with structural equation model. According to the experience economy theory, there are four dimensions as entertainment, education, esthetic and escapist. Some hypothesis is tested by Jung et al. (2016) and they conclude that social presence affects the entertainment, education, esthetic and escape experience positively. Except for esthetic the entertainment, education and escape experience also influence visitor experience positively. Besides, visitor experience has a positive impact on intention to revisit the visitor attraction. Moreover, virtual reality (VR) technology is used in theme parks similarly. According to the Wei et al. (2019), presence of VR impacts on overall theme park experience and intentions to revisit and recommend. In addition, Marasco et al. (2018) result that perceived visual appeal (PVA) of the virtual reality experience with wearable devices affect positively the behavioural intentions to visit a cultural inheritance site in a destination in Naples, Italy. Li and Chen (2019) also revealed that perceived enjoyment of VR influences positively on tourists' travel intention. On the other hand, Bec et al. (2019) showed that usage of digital technology in heritage tourism do not only enable to preserve or manage cultural heritage but also improve tourist experience and interested in history subsequently. In the most general sense, it can be said that VR and AR experiences in tourism has been more similar to real life from day to day. Wagler and Hanus (2018)'s results also support this idea which revealed that 360-degree video tourism may be very similar to real world experience.

4. A CONCLUSION FOR THE FUTURE TOURIST EXPERIENCES

One of the results from literature review is increasing virtual and augmented reality technology use in tourism has closed the gap between virtual and real life from day to day. As a result of this, we can propound a stimulating question about this research interest. Clearly, we able to ask that what happens if the difference between real and virtual life is completely closed? Is traditional tourism converted into a virtual tourism? Maybe, transforming to

completely virtual looks like a science-fiction or fantastic idea, but smart tourism proceed to become fast moving industry. Therefore, it's clear that unprecedented change is inevitable for this area.

Literature review showed us that studies on the effects of augmented and virtual reality technologies are common on museum visit experiences. Interactive museum experiences are generally affected by three ways the physical, personnel and social context (Falk and Dierking, 1992, cited by Galani, 2003). In addition, basic and general elements of influencing visitor experience attention, involvement, engagement, immersion and cognitive absorption (Han et al. (2018). These are usually related to the personal sense, but together with museum or cultural visits have also social aspect because of cultural and social interactions. Technological advantages also create remote visitor who obtain information via to internet. These kinds of visitors are not similar to the local visitors, because many of them have never been there physically. Therefore, changes in digital technologies reveal a new kind of visitor: remote visitor (Galani, 2003). Augmented and virtual technologies are commonly used in museum tourism, but also used in booking and marketing stages within the sector, so they create pure virtual experiences, and also conscious consumer and increasing competition environment for the tourism sector. Apart from this, tourist experience has also a positive effect on intention to revisit the visitor attraction, so augmented and virtual reality technology using impacts on revisiting the destination, museum, theme park etc. It's clear that augmented and virtual realities diffuse within the tourism sector specifically.

Lastly, we can make some evaluations on the future tourist experiences from examples to hold a view about impacts of VR and AR technologies. First of all, virtual tours affect experiences during the booking stage. In the future, there will not be any tourists who do not see the destination beforehand thanks to the virtual tours. Thus, future tourist experiences will be more conscious because of raise awareness with diffusion of AR and VR technologies in all tourism area such as heritage, cultural, educational, sport and adventure tourism etc. The fact that, experiences are very close to reality, so it brings to mind the question will tourism become purely virtual in the future? For instance, demand for pure virtual ones will be more preferred by participants especially in educational tourism. Perhaps, completely virtual experiences will be sufficient to satisfy individuals emotionally, spiritually and intellectually for all kinds of tourism activities. Yet, we have a limitation about this evaluation of future tourist experiences. Because, we don't know for certain whether AR and VR technologies will be adapted to tourism at this level in the future. However, it is clear that increasing virtuality will increase the demand for tourism activities.

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