Chapter 3
Augmented Reality: Applications and Implications for Tourism

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ABSTRACT
Technological advances have had an impact on many industries as well as the tourism industry. Augmented reality applications, one of the emerging new technologies in recent years, have also started to be used in our daily lives. Augmented Reality (AR) is a technology that allows its users to see the real world together with an additional virtual world that is added in real time to the same field of view. The augmented reality applications contribute to the enrichment of tourists’ tourism experiences, especially during their visit and result in augmented satisfaction levels. Furthermore, it is one of the effective tools that can be used against the wear and tear of cultural heritage sites caused by overcrowding. In this chapter, the application fields of the augmented reality in the field of tourism have been discussed under the sub-titles. As a result of our study, recommendations for the development of AR applications both for the literature and real-life application have been presented.

INTRODUCTION
Today, as it is the case in many industries, there has been an intense competition in the tourism industry as well. In the face of this competition, the organizations in the tourism industry have used new technologies to stay competitive and develop marketing campaigns in various forms (Jung & Han, 2014). One of the techniques developed in this challenging competition is Augmented Reality (AR) applications. The AR technology is a new technology that can offer many opportunities that are difficult to be presented and met by the other technologies (Alkhamisi & Monowar, 2013).

In recent years, there have been many augmented reality applications used in different industries in the world. The augmented reality applications are used in many fields such as industry and military,
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training and education, travel and tourism, medicine and health care, and retail and marketing (Martínez, Skournetou, Hyppölä, Laukkanen, & Heikkilä, 2014). The tourism industry is also one of the industries where augmented reality applications have a comprehensive area of implementation. The tourism industry is an area in which especially the AR applications have higher potential of use. The availability of the AR applications, especially in mobile devices, causes these applications in the tourism industry to become even more widespread.

Today, the question of protecting cultural heritage has become very important. In addition to natural degradation, due to the negative effects caused by development activities and overcrowding, inheritance conservation efforts are vital in ensuring the sustainability of heritage sites. Just at this point, the advances in digital technologies such as virtual reality (VR) and augmented reality (AR) are the applications that can be valuable in preserving the heritage. These technologies will minimize the impact of overcrowding in the threatened heritage sites, but at the same time they will increase the overall experience of the visitors (Ab Aziz & Siang, 2014). The purpose of this kind of synergy between reality and virtual is to develop and consolidate the place-based economic development, culture, quality and the integration of local resources by preserving their historical identities. The tourism products are developed to include more cultural offerings among the various participating institutional actors, with a balanced dose of competition, co-operation and coordination (Garau, 2014). Augmented reality applications in the tourism industry are dealt with within the scope of smart tourism (Buhalis & Amaranggana, 2013; Koo, Shin, Kim, Kim, & Chung, 2013).

The aim of this chapter is to explicate the concept of augmented reality, the different aspects of it from other similar concepts, the infrastructure requirements, and analyze the applications examples in the tourism industry in the world especially within the content of destination marketing. Hence, in the background section, firstly the relationship between the concept of augmented reality and virtual reality, and the hardware and software infrastructure of the augmented reality is discussed. Afterwards, augmented reality applications in the tourism industry are discussed together with relevant examples. In the conclusion section, technical and social problems of the augmented reality applications are discussed and proposed solutions are presented.

BACKGROUND SECTION

Augmented Reality

AR is a combination of real-object and computer-generated data where the virtual object has been collated with the real world. This means that it is visible to the user that the virtual field and the real object co-exist in the same place (Azuma, 1997). The AR technology proposes that the real and virtual objects coexist in the same place (Linaza, Gutierrez, & García, 2014, p.498). Today, especially the rapid development of the latest generation of mobile devices now allows anyone with a computer or just a smartphone to be able to make connections in real time and get information from the virtual world as a result of augmented reality through the overlap of information layers (Garau, 2014). The rapid development in the use of smartphones and mobile applications create new ways of connecting with the visitors in many sectors as well as in the tourism industry (Kennedy-Eden & Gretzel, 2012).
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