

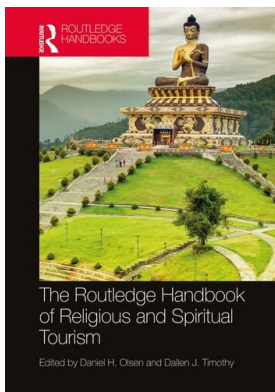
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THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN RELIGIOUS TOURISM

Suzanne Amaro, Cristina Barroco, and Paula Fonseca

Introduction

It is well known that information and communication technologies (ICTs) have completely transformed the tourism industry (Bethapudi 2013; Buhalis & Law 2008; Buhalis & O'Connor 2005; Ukpabi & Karjaluoto 2017), creating unprecedented opportunities for tourism and hospitality businesses (Law, Buhalis & Cobanoglu 2014). Not only have they changed the way firms are managed, but they have also changed consumer behavior in all phases of the decision-making process (Law et al. 2014).

These transformations have attracted researchers for many years, driving many studies on the use of ICTs in tourism (Bethapudi 2013; Buhalis & Law 2008; Hausmann & Weuster 2018; Neuhofer, Buhalis & Ladkin 2015). These studies stress how new technologies enhance the tourism experience, provide tourist information, improve service quality, and contribute to greater traveler satisfaction. However, most of these studies have focused on general tourism. There are tourism niches, such as religious tourism, where one may argue that new technologies are less important. Indeed, this argument seems irrefutable in the religious context considering that secularization theory suggests that “strong religious affiliation will be negatively related to all forms of mass media use because a vast majority of media content does not reflect traditional religious values” (Armfield & Holbert 2003, p. 30) and that, with modernization, institutionalized religions will become more irrelevant (Kluver & Cheong 2007).

According to this line of thought, it is interesting to note that almost 20 years ago Armfield and Holbert (2003) found that the more religious people were, the less likely they were to use the Internet. However, this is unlikely to be the case today. Recently, the Pope unveiled the “Click to Pray” app, calling for people to download the app and pray with him (Lapin 2019). He pointed out that the Internet was a way “to stay in touch with others, to share values and projects and to express the desire to form a community.” This shows how times have changed and that perhaps religion and ICTs can go hand in hand. Indeed, ICTs are now widely used for religious purposes (Ramos, Henriques & Lanquar 2016) and are being increasingly used by all players: religious site managers, religious tourists, faith tour organizers, and other interested parties. Hence, technology is changing religious tourism, just as it has changed other areas (Rashid 2018), such as heritage tourism, more generally.

Nowadays, managing religious sites presents major challenges. On the one hand, visitors are diverse (Hughes, Bond & Ballantyne 2013), ranging from devoted pilgrims to tourists with secular motivations, both of which may include people who travel alone or with families and people with disabilities (Gassiot, Prats & Coromina 2015). On the other hand, overtourism, preservation of heritage sites and sustainable tourism practices are topics that have recently received much attention (de Jong & Varley 2018; Gurira & Ngulube 2016). Furthermore, ICTs have contributed to a more informed tourist that has consequently become more demanding.

This chapter provides an overview of the use of ICTs in the religious tourism industry, evidencing how useful they can be in this specific tourism context, as they are in the tourism industry in general. The chapter also examines how ICTs can be used to manage religious sites, events, and pilgrimages more effectively in such a challenging environment.

Religious tourism

Religious tourism, considered to be one of the oldest types of tourism (Rinschede 1992), has been growing in popularity worldwide in recent years (Bond, Packer & Ballantyne 2015; Griffin & Raj 2017). Travelling to sacred places was, and continues to be, an inherent aspect of almost every culture and today worldwide, more and more people are travelling to sacred sites (Blackwell 2007).

The World Tourism Organization estimates that over 300 million tourists visit the world's key religious sites every year, with approximately 600 million national and international religious trips taking place throughout the world (Griffin & Raj 2017). Moreover, religion is increasingly seen as an important driver of tourism (deAscanis & Cantoni 2016). For instance, countries that are home to religious buildings or sites have the potential to become popular pilgrimage tourism destinations (Bideci & Albayrak 2016).

Religious tourism benefits several stakeholders and can have significant impacts. As an example, Egresi, Kara and Bayram (2014) concluded that the effect of religious tourists in the province of Mardin, Turkey, was clearly positive. There were higher occupancy rates in the hotels, new hotels had been built, visitors ate at local restaurants, and new jobs had been created. Durán-Sánchez, Álvarez-García, del Río-Rama and Oliveira (2018) also argue that religious tourism benefits all its stakeholders, including shrines and holy sites through increased donations and the hospitality sector through increased income. The *hajj* pilgrimage to Mecca illustrates the positive economic benefits of pilgrimage. It is estimated to bring in 16.5 billion USD annually, around 3% of Saudi Arabia's gross domestic product (D'Ignotti 2016). Given its economic importance, it is not surprising that religious tourism has captured the attention not only of academics but also practitioners, such as destination marketing organizations, planners, and even moviemakers (Choe & O'Regan 2015).

Defining religious tourism has been a major challenge over the years, and there is no consensus on a standard definition. One of the earliest definitions was proposed by Rinschede (1992), who argues that it is a form of tourism whose participants are motivated partially or exclusively by religious reasons. In contrast, Geybels (2014) suggests that religious tourism includes people on holiday choosing to visit religious sites or festivals without religious or existential engagement. Religious tourism can include excursions to pilgrimage shrines, religious conferences, religious festivities, sacred heritage sites, and walking religious routes, among other activities (Barroco, Antunes & Dias 2017). Studies have clearly evidenced that visits to religious sites and pilgrimages may not all be motivated by faith. For instance, grand cathedrals attract visitors with cultural motivations (Bond et al. 2015), whereas pilgrims

on the Way of Saint James (*Camino de Santiago*) are mostly motivated by spiritual reasons (Amaro, Antunes & Henriques 2018). Other studies have shown that the Camino is also becoming an increasingly popular heritage route for non-devotees (Ron & Timothy 2019; Timothy & Olsen 2018). Several other studies have shown that there are many other reasons to visit sacred sites besides religion (Bideci & Albayrak 2016; Cerutti & Piva 2016; Drule, Chiş, Băcilă & Ciornea 2012).

Deconstructing whether religious tourism is conducted for purely religious motives or not is not the aim of this chapter. Instead, for the purposes of this chapter, religious tourism is a type of tourism that includes a religious site as a destination or a pilgrimage to a religious site or religious event, regardless of the traveler's motivation.

Religious tourism and ICTs

ICTs are being increasingly used for religious purposes (Ramos et al. 2016) and, as a consequence, are changing the face of religious tourism (Rashid 2018; Tripko & Dragan 2011). The subsequent four sections provide an overview of the various media through which ICTs are being used for religious tourism purposes: webpages, social media, augmented and virtual reality, and mobile devices and applications.

Webpages

Religious tourists, like other tourists, frequently use the Internet to plan their trips. According to Akbulut and Ekin (2017), webpages may be the first source of information about a sacred site or destination and have an inevitable impact during the destination selection process. Indeed, the Internet has become a popular tool for gathering information about sacred sites, as well as providing images and other required details related to travel planning (Barroco, Antunes & Amaro 2018).

Gupta, Editor and Gulla (2010) conducted a study targeting people who had already visited the Vaishno Devi Shrine in India, to examine visitors' use of the shrine's official website. Most of the respondents (65%) were aware of, or had used, the shrine's webpage. Sánchez-Amboage, Ludeña-Reyes and Viñán-Merecí (2017) also found that the Internet (Google and Facebook) was the online information source most used on the pilgrimage to the Virgin of El Cisne, one of the largest religious events in Ecuador.

Websites are not only used to promote religious sites but also religious events. The Catholic World Youth Day is an example of such a worldwide religious event that has a website to promote the encounter with the Pope every three years in a different country. Narbona and Arasa (2019) conducted a study on users' visits to the website during the 31st World Youth Day in Krakow. Their findings suggest that official websites are the most appropriate channels to communicate practical information about such mass faith events, especially since the main target is young people who commonly use new technologies in their daily lives.

Despite the importance of webpages for religious tourists, many religious destinations lack an Internet presence. Akbulut and Ekin (2017) found that only 64% of the sacred sites in Europe had a website, and they suggest that these sacred localities should improve search results by highlighting more relevant search engine keywords. In a study conducted about the presence of Portuguese Marian Shrines on the Internet and the quality of their websites, Barroco, Antunes and Amaro (2018) found that only 8 of the 39 sanctuaries had their own webpage. Rashid (2012) also found that the official site for the Blue Mosque in Istanbul was

disappointing, since it was poorly designed, not useful and did not consider tourists' needs, arguing that the webpage needs to be customer-focused to enhance the visitor experience.

In addition to providing information, websites can also be used to create virtual pilgrimages, a new way of doing pilgrimages that allows an individual to use technology and the Internet to create a "mythscape", to experience the divine, using interactive tools to entertain the traveler in a unique form and finally to provide people the opportunity to do this type of activity in the comfort of their own home (MacWilliams 2002). Hill-Smith (2009), who uses the term "cyberpilgrimage", highlights other benefits: 24-hour availability of pilgrimage sites; everyone is welcomed, regardless of faith; the visit is free of charge; shrines and artifacts can be seen without physical restrictions; and finally, safety is ensured since many holy locations are targets for man-made and natural disasters.

Social media

Social media has provided tourism companies with unprecedented opportunities to understand tourists better (Leung, Law, Van Hoof & Buhalis 2013), engage with them and promote their businesses. Religious tourism can also gain from the use of social media as it is an efficient support in promoting religious destinations and religious programs (Yesil 2013). Prats, Aulet and Vidal (2015) note that many religious sites have a Facebook page, both with religious and touristic content. Religious sites use other social media as well. For instance, the Vatican News, besides having a Facebook page, also utilizes Twitter, Instagram and YouTube. The YouTube channel has a webcam that allows users to view the Vatican 24 hours a day. These social media platforms are useful to provide tourists with relevant information and to engage with them, while at the same time promoting the religious sites. The Abbey of Montserrat, in Catalonia, Spain, is a notable example of how social media can be used to promote religious tourism, by promoting a contest, #SelfieMontserrat, on Instagram, Facebook and Twitter.

Sánchez-Amboage, Ludeña-Reyes and Viñán-Merced (2017) carried out a survey among visitors at the Virgin of el Cisne shrine in Ecuador and found that social media played an important role in promoting the pilgrimage and the sanctuary. The study found that the pilgrimage's Facebook pages have high levels of engagement, with Santuario de la Virgen de El Cisne having the highest (54.4%). This is a high level of engagement, considering that Facebook social engagement for national tourism organizations does not usually reach even 1% (Mariani, Mura & Di Felice 2018).

Tourism-specific social media websites can also be used to study religious tourists' needs and satisfaction. For instance, Cerutti and Piva (2016) assessed how the Italian religious destinations of Sacred Mount of Oropa and Sacred Mount of Orta were perceived by tourists by analyzing TripAdvisor reviews. They assert that understanding tourists' feedback on destinations through these types of platforms is a useful tool for local management in promoting their destinations better and producing more satisfied guests. Reviews of religious sites on TripAdvisor were also analyzed in a case study of the Lalibela Rock-Hewn Churches in Ethiopia (Ndivo & Cantoni 2016). Many reviews indicated a lack of tourist satisfaction and provided usable information about why this was the case. These examples show that religious site reviews online can contribute to a better understanding of visitors' real needs and, consequently, local management can better plan strategies to improve the quality of future visitor experiences.

Many studies have found that recommendations and reviews on social media have a salient impact on tourists' travel planning and decision making (Fotis, Buhalis & Rossides

2011; Hudson & Thal 2013). In the religious tourism context, social media is also an important source of information for travelers and provides an electronic tool to disseminate word of mouth (e-WOM) about sacred places and events. Religious tourists are similar to other tourists regarding their engagement in e-WOM during the information search phases of trip planning and during the journey itself (Khan & Khan 2015). Moreover, religious tourists tend to depend a great deal on the recommendations of those who have gone before them. E-WOM is therefore an important planning tool, in particular for those visiting a religious site for the first time (Iriobe & Abiola-Oke 2019).

Augmented and virtual reality

The use of augmented reality (AR) and virtual reality (VR) technology is another widespread trend within the tourism sector, with one of the main aims being to improve the tourist experience (Kounavis, Kasimati & Zamani 2012). Both technologies integrate virtual and real-world elements (Marr 2019). Several studies have provided evidence and discussed how VR and AR can enhance the travel experience (Guttentag 2010; Han, tom Dieck & Jung 2018; Kounavis et al. 2012; Neuburger & Egger 2017; tom Dieck, Jung & Rauschnabel 2018). Ramos et al. (2016) argue that these technologies can also enhance tourists' personal and spiritual experiences in a religious context, such as pilgrimages. Other studies have shown that all visitors to religious heritage sites can benefit from the use of AR and VR technologies, especially as they help reconstruct the ruins of churches and monasteries virtually to enable visitors to experience how they might have looked and felt centuries ago (Fusté-Forné 2020; Rueda-Esteban 2019).

With VR, users put on a head-mounted display or a VR headset and are immersed in a computer-generated "reality", sensing that they are moving among virtual objects on a screen (Marr 2019). An example of VR for religious tourism is the Experience Mecca Virtual Reality. This virtual tour takes people around the major landmarks of Mecca's holy places, offering a gravitating and immersive look at the *hajj* rituals. It also allows users to interact with other worshippers, or "go back in time" to see how Muhammad and other prophets lived (Budgor 2014).

AR is understood as the virtual world coexisting within the real (physical) world (Craig 2013). It can be very useful since it provides access to location-based information, relevant to tourists' immediate surroundings, content is timely and updated, and it provides interactive annotations that are integrated with map-based services and additional information (Yovcheva, Buhalis & Gatzidis 2012). Another benefit of the use of AR applications is that they can contribute to preserve heritage and religious sites (Fusté-Forné 2020). On the one hand, they provide an alternative to access localities that are being threatened by overtourism, reducing the number of visitors (Ramos et al. 2016). On the other hand, since many sacred sites restrict the use of information signs, AR can provide relevant information to tourists without negatively impacting the environment (Jung & Han 2014).

Some examples of AR for religious tourism include experiencing medieval churches as they existed hundreds of years ago (Fusté-Forné 2020; Rueda-Esteban 2019) or seeing what the Sagrada Família in Barcelona will look like when construction is eventually completed. Zaibon, Pendit and Abu Bakar (2015) developed an AR application to help visitors experience their visit to Melaka, Malaysia, a historical city that is home to many mosques, temples, churches and other cultural heritage sites that together form a UNESCO World Heritage Site. Zaibon et al.'s (2015) study found that users preferred AR over traditional media and that they would like to use it again in the future.

Mobile devices and applications

The use of smartphones and mobile applications (apps) is another major trend in the use of ICTs in religious tourism. For instance, regarding pilgrimages, Nickerson, Austreich and Eng (2014) found that 77% of the respondents who had walked the Way of Saint James (*Camino de Santiago*), had taken mobile devices, and 38% had used a Camino-specific app. Pilgrims are interested in using apps during the pilgrimage, as they are useful guides and allow them to save time (Antunes & Amaro 2016). Research has shown that pilgrimage participants will be more willing to use an app for a pilgrimage if it has general information about the route and less information about the religious features (Amaro, Duarte & Antunes 2019).

There seem to be contrasting opinions regarding the use of technologies by pilgrims. Nickerson et al. (2014) discovered that views about the use of technology on the *Camino de Santiago* can be quite strong, both positively and negatively. Qurashi and Sharpley (2018) also found that new technologies have both positive and undesirable implications for pilgrims' spiritual experiences. Considering some of the least positive aspects, pilgrims reported that new technologies negatively affected their spiritual experience because they were a distraction. Feeling the spirit demands concentration on worship and the non-material elements of pilgrimage rituals (Qurashi & Sharpley 2017). One respondent even suggested that using new technologies on the hajj was "nothing but a sin" (Qurashi & Sharpley 2018, p. 43), and it is likely that many pilgrims feel the same. When pilgrims who were using Camino apps were asked if they were better than paper-based guides, only 12% agreed or strongly agreed (Nickerson et al. 2014). Many pilgrims feel that mobile technology can distract them from the Camino experience because of the constant need to charge their devices (Nickerson & Eng 2017).

However, on a more positive note, some people believe that ICTs can enhance the religious tourism experience. For example, 57% of the respondents who had carried mobile devices on the Camino de Santiago believed that the devices had enhanced their Camino experience (Nickerson et al. 2014). Alshatnawi (2012) highlights the benefits of new technologies in pilgrimages, by proposing the use of Quick Response (QR) codes for pilgrims on the journey to Mecca. A QR code is a two-dimensional form of a barcode that can be read with a smartphone or other device, connecting directly to websites, phone numbers and much more (QRme 2019). Traditionally, pilgrims on the way to Mecca resort to reading brochures that explain what they should do to follow the steps according to the prescribed rituals and also the locations they may visit during their stay in Mecca (Alshatnawi 2012). With QR codes posted at different locations along the pilgrimage route, pilgrims can access information with their mobile devices at specific locations, helping them make their journey more efficient (Alshatnawi 2012).

In a different religious tourism context, Narbona and Arasa (2016) reflect on the importance of mobile apps and instant messaging during large religious events, using the beatification of the Catholic bishop Álvaro del Portillo as a case study. This ceremony was held in Madrid in September 2014, with more than 250,000 people from over 70 countries (Narbona & Arasa 2016). The Álvaro del Portillo app was created for this event to provide useful information and support for attendees, such as news, spiritual texts and logistical information (e.g. how to travel from the airport to the event, schedules and maps) (Narbona & Arasa 2016). The app also included a map that allowed pilgrims to visit places linked to the life of the bishop, bringing pilgrims to other places in the city, such as Museo del Prado, the Paseo de la Castilla and the Plaza Mayor. The organization saved money that would have been spent on booklets for the Mass, since the app contained a ceremony book, with

the texts needed to follow the religious ceremony. Álvaro del Portillo was also available on WhatsApp. Messages were sent to those who joined, promoting the website and Twitter, with invitations to download the ceremony books, messages with useful contacts and texts requesting donations. The messages sent via WhatsApp, helped increase visits to the site. This example illustrates how an app created for a religious event can serve as an excellent form of communication, collect donations, save money, promote touristic sites and maintain contact with participants.

Apps can also be important in making religion accessible to all. An example to demonstrate this is the MyEyes app of the Shrine of Fatima in Portugal (one of the most important Catholic shrines in the world dedicated to the Virgin Mary). This technology allows blind pilgrims to experience the shrine with greater autonomy. Tourists with visual impairments can receive relevant information about the shrine: a description of the location, practical directions to help them get around and the location of useful facilities (e.g. information desk and public restrooms) and the Pilgrim Itinerary. Another example is a mobile application launched in June 2019 in Jerusalem by Israel's Center for the Blind (Lesley 2019). This new app makes the city's holy sites accessible to the visually impaired by catering to their specific needs. It identifies people's location within the city and connects them to a database that describes the place where they currently are.

Apps are also emerging in religious tourism to attract and entertain different types of travelers, such as children, who usually travel with their families to holy sites but are not normally the main audiences for this type of tourism. These types of apps can educate, amuse and even captivate younger tourists to want to visit the religious destination. The Shrine of Fatima created two such apps for children. One of these, *Fatima, a Story Filled with Light*, is an interactive book designed for children between the ages of 3 and 8. This app encourages children to learn about the story of Fatima by interacting with the main characters using text, auditory prompts and purposeful touch. The other app, *The Little Shepherds Game*, is a game for children over the age of 4.

Tracking technologies

To better plan and manage tourist areas, it is necessary to comprehend how tourists move through space and time (Lew & McKercher 2006; Shoval & Ahas 2016). With the use of tracking technologies, such as Global Positioning Systems (GPS), Bluetooth technology, Radio-Frequency Identification (RFID), smartphones and other mobile devices with embedded sensors, researchers are better able to measure tourists' movements and explore new paths that will allow tourism research to develop further.

Shoval and Isaacson (2007) conducted a study using digitally based methods to see if these were feasible for collecting data about the spatial behaviors of tourists. They performed three different experiments, which included three types of tracking technologies: GPS, land-based antennas, and a hybrid solution. Two of the three experiments were linked to religious destinations. One involved the Old City of Jerusalem and the other the biblical historic city of Nazareth. They concluded that tracking devices are effective tools for analyzing tourists' movements in space and time.

In a longer study taking place over four years, involving 1,030 tourists, Cohen-Hattab and Shoval (2015, p. 12) collected data using "highly accurate GPS devices" to study time-space patterns in the Old City of Jerusalem. This sample contained a large number of Jewish groups (900) and 40 Christian groups. This digitally based method allowed the researchers to conclude that the tourist areas visited within the Old City are highly segmented.

To understand crowd dynamics during the annual hajj in Mecca, Jamil, Basalamah, Lbath and Youssef (2015) used tiny, wearable Bluetooth Low Energy (BLE) tags and some smartphones containing GPS to collect mobility data among pilgrim groups containing some 732 volunteer pilgrims from three different countries. The results allowed them to analyze different behaviors in group dynamics when related to entry/exit times, length of stay at the event, group cohesion and hotspots for crowd gathering.

Not only are these tracking technologies important for examining religious tourists' behavior, but they also benefit religious tourists. Indeed, Saudi Arabia gave out GPS-enabled electronic bracelets to Mecca pilgrims in 2016, following a major trampling tragedy in which more than 750 people died and 900 were injured. The bracelets included personal and medical information to help authorities in case of an emergency, as well as other information for worshippers, such as prayer times and a multi-lingual helpdesk to guide non-Arabic speakers (BBC News 2016). The pilgrims pointed out that the bracelet allowed them to access important information and provided safety and security because it helped locate lost devotees and delivered help to those in need (Qurashi & Sharpley 2018).

Conclusion

The symbiosis of ICTs and the tourism industry is undeniable, and religious tourism as a niche form of tourism is no exception. Tourists today seek to learn more and discover the world using ICTs, which has led to an increase in tourist activity at religious sites and a challenge for those who manage these sites (Hughes et al. 2013). This chapter highlighted several uses of ICTs in religious tourism contexts and how religious sites, events and pilgrimages can be more effectively managed. Despite some people not approving of the use of new technologies in religious tourism, it is undeniably a powerful tool with enormous potential. There is still a lot of research to be done in this area given that few studies examine the use of technologies in religious tourism contexts, a similar conclusion that Amaro et al. (2019) noted. Nevertheless, this chapter has shown several developments in the use of ICTs in religious tourism and suggests six major areas where ICTs can intervene in religious tourism:

- 1 Enhance tourists' experience
- 2 Promote religious tourism
- 3 Facilitate accessible tourism
- 4 Ensure sustainable tourism
- 5 Provide safety
- 6 Advance religious tourism research

Regarding the first area, many studies have shown that ICTs can enhance tourists' experience in several ways. For instance, they can provide information before and during a religious journey. This is a benefit that visitors to religious sites and events value, increasing their satisfaction and perhaps their intent to return. ICTs can also enhance the religious tourist's experience with the use of AR, VR, QR codes and apps, allowing them, for instance, to interact with other worshippers, access information in their own language, access relevant information or even to "go back in time". Moreover, analyzing online reviews of religious sites and pilgrimages can help managers better understand religious tourists and, thus, offer services adapted to their needs, thereby enhancing their experience.

The second major area of ICT intervention is to promote religious tourism. New technologies, including websites, social media and other digital sources, are the least expensive

marketing media available and are powerful tools in planning and promoting religious events as they aid in heightening pilgrims' experiences, leading to a higher likelihood of success of the event (de la Cierva, Black & O'Reilly 2016). ICTs can help attract more visitors and different types of religious tourists, such as families with small children, non-religious tourists or devoted pilgrims from different religions with secular motivations. Furthermore, ICTs can even contribute to obtaining donations that are much needed in several cases to support religious site maintenance.

The third major area of ICT intervention is to facilitate accessible tourism. People with disabilities are restricted in the number of places they can visit because of their limitations or because of the lack of accessible infrastructure. People with special access needs visit religious sites and feel more attracted to those where they feel independent and dignified than others (Gassiot et al. 2015). This chapter has shown how ICTs can be a powerful instrument for tourists with special needs by providing, for example, apps for blind people or by allowing people to virtually visit a religious site or undertake a virtual pilgrimage.

ICTs can contribute to a more sustainable tourism, the fourth major area identified, in at least two ways. First, since many religious sites restrict the use of information signs, ICTs can provide information and experiences without creating signage pollution. Likewise, technology also helps destinations and attractions avoid printing brochures and pilgrimage maps, which reduces reliance on paper materials. Second, with virtual pilgrimages, virtual tours, 360° photographs, and videos online, religious tourists can now visit a sacred site without having to physically travel to the location, reducing the impacts of mass footfall, a major problem for some religious sites that are currently threatened by overtourism.

ICTs also help address safety concerns, the fifth major area, related to holy locations that are many times targets for man-made and natural disasters. "Cyberpilgrimage" is an example of how religious tourists may be safer not physically being at a holy location that is considered dangerous. The use of electronic bracelets by pilgrims travelling to Mecca with personal and medical information can help authorities in case of an emergency and in locating lost pilgrims. Yamin (2019) provides many suggestions on how technology can be used to avoid catastrophes at crowded religious events.

Finally, ICTs can contribute to advancing religious tourism research. Indeed, tools such as tracking devices can help researchers and managers gain more comprehensive knowledge of religious tourists' behaviors regarding, for example, entry/exit times, length of stay and hotspots for crowd gathering. From a practical point of view, this can help religious site managers better design religious attractions, improve infrastructure and other services unique to this type of tourism in order to better accommodate all types of religious tourists (Shoval & Ahas 2016). Moreover, tracking technology can be useful in forecasting positive and negative events and prevent overcrowding (De Cantis, Ferrante & Shoval 2018). The use of such technology, however, raises ethical concerns for such research efforts that might infringe on the privacy of participants (Raun, Ahas & Tiru 2016; Shoval & Ahas 2016).

Religious heritage sites are used by governments and destinations to attract tourists (Olsen 2006). To manage these sites more effectively, it is important to identify aspects that will contribute to a better tourism experience and find ways to appeal to a more diverse and demanding range of visitors (Hughes et al. 2013). In this context, religious site managers should consider the benefits of ICTs and develop strategies to incorporate them in religious tourists' touchpoints to increase innovation and differentiation from other competitors. These strategies will not only benefit religious sites, but all stakeholders, in particular tourists and local businesses.

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