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Research Paper

Value of augmented reality at cultural heritage sites: A stakeholder approach



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ABSTRACT

As the pace of augmented reality (AR) adoption quickens, cultural heritage sites have begun to focus on the opportunities provided by this new and innovative technology. However, small organizations often fear making large investments in AR without a proof of concept due to the risk of failure. Therefore, it is imperative to explore the perceived value of AR from multiple stakeholders' perspectives to ensure the long-term viability of technological innovations in small cultural heritage organizations. The present study uses a small museum in the UK to explore the perceived value of the implementation of AR within the museum context using a stakeholder approach. Qualitative data were gathered from twenty-four stakeholders via focus groups and interviews. This case study shows that AR has economic, experiential, social, epistemic, cultural and historical, and educational value from both internal and external stakeholders' perspectives. AR is considered to be a way to preserve history, enhance visitor satisfaction, generate positive word-of-mouth, attract new target markets and contribute to a positive learning experience. This paper contributes to the knowledge gap in the area of stakeholders' perceived value of AR for cultural heritage tourism.

1. Introduction

The pace of adoption of augmented reality (AR) in the tourism sector is increasing. While Yovcheva, Buhalis, and Gatzidis (2012) were one of the first researchers to identify the potential of overlaying digital content onto tourists' real environment, nowadays many destinations and organizations have either implemented or begun to consider the opportunities offered by this new and innovative technology to enhance the visitor experience. The last few years have seen a large number of scholars conducting research on AR user requirements (tom Dieck, Jung, & Han, 2016), AR acceptance and behavioral intentions (Jung & tom Dieck, Lee, & Chung, 2015; Rauschnabel & Ro, 2016; tom Dieck & Jung, 2015), the creation of an AR tourism experience (Han, tom Dieck, & Jung, 2017), as well as AR tourism gaming (Linaza, Gutierrez, & García, 2013). Although larger destinations and organizations have been able to implement mobile AR applications to test opportunities for visitor engagement, smaller organizations with limited resources need to carefully examine the potential benefits before investing resources in AR. Chesher and Skok (2000) revealed that many smaller organizations fear that the costs of investing in these technologies do not outweigh the benefits received afterwards. Therefore, the identification of AR's perceived value to stakeholders is a necessary first step prior to investment and implementation.

Taebi, Correlje, Cuppen, Dignum, and Pesch (2014) noted that technological innovations are made within a specific context, and a

broad range of stakeholders should be involved in the planning process to evaluate their potential value before they are implemented. McCabe, Sharples, and Foster (2012) supported the need for research on digital technology for the tourism experience by using a stakeholder approach. Business literature has long found value creation to be directly linked to long-term profitability and business success (Peppard & Ward, 2016). There are a number of perspectives on perceived value. Gordon, Butler, Magee, Waitt, and Cooper (2015) theorized perceived value into subcategories of ecological, social, emotional, economic and functional value. Jiang and Kim (2015) recently added epistemic value as one of the perceived value perspectives within their latest theoretical model. Within the cultural heritage tourism context, Chiabai, Paskaleva, and Lombardi (2013) identified environmental, emotional, historical, cultural, tourist and social value as important kinds of value.

All these value dimensions provide important implications for how information systems are delivered and accepted (Baird & Raghu, 2015). However, research on the perceived value of AR applications within the cultural heritage tourism context is limited. Particularly small cultural heritage organizations have to ensure that the benefits expected by stakeholders are delivered when implementing AR, due to the high costs involved (Chesher & Skok, 2000). Furthermore, Lee, Usley, and Meuter (2013) revealed that the majority of research concerning technological developments to date focused solely on customer orientation and market orientation in large companies. Therefore, the present study uses the case study of a small museum in the UK to examine the

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perceived value of AR applications within the museum context using a stakeholder approach.

2. Literature review

2.1. Augmented reality in cultural heritage tourism

AR is the digital overlay of information on users' immediate surroundings, using devices such as mobile phones or head-mounted displays (HMD), and smart glasses in particular (Rauschnabel, Brem, & Ivens, 2015). Over the past few years, the advancement in sensor technologies has led to increased availability and use within the tourism sector (van Krevelen & Poelman, 2010). Developed in 1968, AR has been applied to many industry sectors (Jung, Kim, & Kim, 2013). More recently, the tourism sector has begun to understand the opportunities for overlaying digital content onto tourists' real environment (Jung, Chung et al., 2015). Navigation functions and the potential to overlay content without disturbing the real environment are just some advantages that make AR so attractive to the tourism industry (van Krevelen & Poelman, 2010). Likewise, it allows historical buildings to be brought back to life through re-enactments of old events and explanations of their meaning (Gervautz & Schmalstieg, 2012). Advancements in technology, moving from marker-based to marker-less overlays, have made AR even more suitable for the tourism context, as tourists can retrieve context-based content using global positioning system (GPS) devices. In addition, enhanced image recognition allows tourists to scan buildings and objects and receive content without designated QR codes (Wang, Kim, Love, & Kang, 2013). These technological developments have made the tourist AR experience more user-friendly and efficient, and are thought to contribute to the overall acceptance of these applications (tom Dieck & Jung, 2015).

Previous research shows the clear potential of AR to create an interactive and enjoyable tourism experience while in the museum context, AR adds another element of learning (Moorhouse, tom Dieck, & Jung, 2017; Yoon, Elinich, Wang, Steinmeier, & Tucker, 2012). As the ability to learn is dependent on learners' collaborative participation in the learning process, interactive features of AR applications can facilitate active learning (Dunleavy & Dede, 2014). Telling hidden stories and enhanced content are some ways museums use AR to enhance the visitor experience (Leue, Jung, & tom Dieck, 2015). In addition, Jung, tom Dieck et al. (2015) conducted a study on cultural differences in AR in heritage sites and found that Western visitors have a strong desire to escape reality through AR applications. Therefore, museums and art galleries in Western culture have to focus more on the creation of an immersive and enjoyable experience compared to those in Eastern cultures, which have a stronger focus on education. Studies in the area of tourism and museum AR have mostly focused on combining tourism products with AR functions (Marimon, Sarasua, Carrasco, & Alvarez, 2010; Noh, Shahrizal, & Pan, 2009). However, research with regards to the potential of AR and its perceived value to museum stakeholders is still limited.

2.2. Value creation through IT

Value creation has been thoroughly discussed in business strategy literature and is generally considered the key to long-term profitability and business success (Peppard & Ward, 2016). In principle, delivering high value affects customer satisfaction and loyalty, which in turn influences business success: thus, value creation is considered immensely important for profitable business operations (McDougall & Levesque, 2000). However, as the term implies, perceived value is subjective, and organizations' internal stakeholders may have different opinions than customers (Eggert & Ulaga, 2002). Melville, Kraemer, and Gurbaxani (2004) proposed a business value model based on the resource-based view (RBV) and revealed that organizations should focus their IT strategies on internal and available

resources rather than on a trend in the external market. In particular, it was revealed that resources should not only be linked to financial assets but to expertise, skills and experiences within the workforce (Ward & Daniel, 2006).

According to Farbey, Land, and Targett (1993), organizational value as delivered by IT can be divided into strategic, management, operational, and functional/support value. Farbey et al. (1993) categorized organizational value according to Mintzberg's (1983) view of the structure of an organization. This structure was based on the empirical study of IT project evaluations in 16 organizations from various industry sectors. Furthermore, Ward and Daniel (2006) extended the concept of generic benefits of IT from the perspective of value management. Applying organization-wide value through IT in the context of cultural heritage tourism, strategic value should: support organization's vision and strategies; be viable in the short and long term; provide visitors with unique value propositions; be innovative; and provide opportunities for new business models. Management value encompasses the enhanced skills of employees and consequent ease of operations (Ward & Daniel, 2006). In addition, new IT systems were found to make existing systems inadequate, which was also found to be of value for management (Farbey, Targett, & Land, 1994). Operational value includes the reduction of costs, enhanced turnaround time and increased income from better quality products and services (Ahire, 1996). Functional and support value includes employee self-service and improved communication opportunities. However, as noted by Brown (2005), these value factors largely differ from case to case. Therefore, it is essential to evaluate opinions from different stakeholders to ascertain that value is achieved. Nevertheless, in particular, research is required to investigate the association of consumers' perceived value with innovative digital services such as AR. Such relationships need to be considered to create business models that reflect the significant impact of consumer value on the delivery of information systems (Baird & Raghu, 2015).

Perceived value spreads across several dimensions including ecological, social, emotional, economic, and functional value (Gordon et al., 2015; Koller, Floh, & Zauner, 2011). Jiang and Kim (2015) added epistemic value in the context of Korean hotels. According to Sánchez-Fernández and Iniesta-Bonillo (2007, p. 437), 'epistemic value is concerned with a desire for knowledge, whether this be motivated by intellectual curiosity or the seeking of novelty'. This idea is closely linked to integrating AR into the museum experience to create a new, interactive way of experiencing history. Interestingly, Kim et al. (2011) considered the experience economy as part of the value creation framework and classified functional, emotional and epistemic value as part of experiential value. A holistic definition was provided by Wu and Liang (2009, p. 588) who defined experiential value as the 'value [that] is derived from how a product creates appropriate experiences, feelings and emotions in a customer'.

The importance of perceived value was also addressed within the cultural heritage tourism context. Chiabai et al. (2013) used a stakeholder approach to explore how innovative information communication technology (ICT) tools can be used to enhance cultural heritage sites. Their findings revealed six categories of perceived value including environmental, emotional, historical, cultural, tourist and social. In addition, Chiabai et al. (2013) found differences in the importance of each value between different stakeholders. This strengthens the need to incorporate a variety of stakeholders' opinions when developing technologies to ensure that all concerns are addressed (Hall & Martin, 2005). Furthermore, vom Lehn and Heath (2005) explored the value of new technologies for the museum experience and found that they can add economic value by increasing visitor numbers. Their research observed that new technology delivered social value by facilitating co-participation in the museum experience, and increased the amount of time visitors spent in an exhibition (vom Lehn & Heath, 2005). This example from the museum sector shows that technology can offer various kinds of value that need to be examined in more detail. As can

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