

# How can Tourist Attractions Profit from Augmented Reality?

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**Abstract** The benefits, value and potential of Augmented Reality (AR) are widely researched. However, the value of AR is most commonly discussed in relation to enhancing the tourist experience, rather than generating revenue or economic returns. Although AR promises to add value to the visitor experience and generate associated benefits, the financial implications and revenue model for AR implementation remain uncertain and therefore too much of a financial risk for most tourist organisations, typically Small to Medium Sized Enterprises (SMEs) characterised by limited funding. Thus, using the case of UNESCO recognised Geedor Tin Mine Museum, in Cornwall, UK, this study identifies ways in which tourism organisations can profit from AR implementation. Fifty semi-structured interviews with Geedor stakeholders, analysed using content analysis reveal a number of ways AR can be introduced to increase revenue generation and profits, therefore filling a gap in research and minimising the risk for managers and practitioners considering AR implementation.

**Keywords** Augmented reality · Tourism · Revenue model · Business model

## 1 Introduction

Throughout the 20th Century the emergence of new adaptive and interactive technologies changed the tourism industry completely (Buhalis and Law 2008). Technologies have revolutionised travel behaviours, such as decision making and

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information searching (Wang et al. 2014), transforming traditional business channels and value networks (Buhalis 2003; Livi 2008). To remain competitive and financially viable, it has been argued tourist organisations must pursue new ways to provide enhanced (Neuhofer et al. 2014; Tussyadiah 2014), enriched and unique experiences (Yovcheva et al. 2013), while offering value adding services (Garcia-Crespo et al. 2009).

For decades, tourism has been considered a tool to stimulate and improve the economy (Ko and Stewart 2002), thus in the modern age, this has progressed to include the adoption of, and investment in new technologies. It is now advised organisations that fail to adopt modern technologies, such as Augmented Reality (AR), will not remain attractive and competitive (Han et al. 2014; Tscheu and Buhalis 2016). Hereby, it is argued future competitive advantages are built around the effective use of technologies that add value to the tourist experience (Carlsson and Walden 2010; Cranmer et al. 2016; Deloitte 2013).

AR has gained much research attention within tourism, for its proven ability to enhance the tourist experience (Garcia-Crespo et al. 2009; Leue et al. 2015), adding value (Cranmer et al. 2016), and creating unique and memorable experiences (Yovcheva et al. 2013). It is widely acknowledged AR creates richer, more immersive content enhancing user's interaction with and perception of the world and thus presents many opportunities to enhance experiences. However, despite many studies exploring and reporting the value of AR, the majority fail to identify and determine its financial benefits and economic potential. Therefore, in contrast to expectations, the adoption and integration of AR has been much slower than predicted (Chung et al. 2015). It is argued one reason for this is the absence of research identifying how AR can be introduced to improve profit potential and create revenue streams. Research is yet to bridge the gap between technological potential and actual value adding economic benefits. Therefore, this study attempts to progress understanding about how tourist organisations can implement and profit from AR by providing new insight, which will reduce the risk associated with AR technology adoption, and help managers and practitioners to better understand ARs financial value, benefits and potential.

## 2 Literature Review

### 2.1 *Augmented Reality in Tourism*

Technology has had a profound effect on tourism, strengthening the need for organisations to find new ways to increase their presence and therefore competitiveness (Tscheu and Buhalis 2016). Proliferation of technology, and increased smartphone ownership has revolutionised the way tourists' access and explore information (Jung et al. 2015). Tourists, now demand 'info-cultural-tainment' experiences, combining leisure, entertainment, culture, education and sociability

(Palumbo et al. 2013). As a result, an increasing number of tourist attractions have begun to explore the use of AR to enhance visitor interactions with, and perceptions of their real-world environment (Roesner et al. 2014). Research praises AR for its ability to allow tourists with limited knowledge of an area to naturally and realistically experience it (Chung et al. 2015; Martínez-Graña et al. 2013), providing tailored and personalised information (Kounavis et al. 2012; Kourouthanassis et al. 2015) and enhance the tourist experience (Kounavis et al. 2012; Marimon et al. 2014).

A study by Palumbo et al. (2013) found AR increases visitor numbers and provides organisations with more scope to reach wider audiences (Chung et al. 2015; Kennedy-Eden and Gretzel 2012). Moreover, Chung et al. (2015) identified AR offers destinations and attractions a way to differentiate themselves and increase competitive advantage. In addition to this, it is argued simply that technology attracts tourists (Lashkari et al. 2010), because it offers added value to the user (Kounavis et al. 2012), facilitating seamless exploration of their surroundings (Yovcheva et al. 2013), thus extending their learning experience (Yuen et al. 2011). As well as this, implementing AR introduces many marketing opportunities, allowing destinations to come to life, giving visitors a better understanding of what to expect and therefore aiding in decision-making and planning processes (Yovcheva et al. 2013). Many of these findings imply AR could have a positive economic benefit, such as increasing competitiveness and therefore, visitors numbers. But, the majority fail to articulate ARs positive profit potential, by failing understand how potential can be translated into economic value. Hence, the financial implications of AR remain too unclear and therefore present too much risk for tourism SMEs.

As a result, contrary to expectations, adoption of AR has been slower than anticipated (Chung et al. 2015), although, it is still argued adopting and investing in modern technologies is a necessity for attractions to remain competitive (Tscheu and Buhalis 2016; Jung et al. 2015) and economically sustainable (Cranmer et al. 2016). The tourism industry currently lacks a framework or model to aid practitioners and managers to effectively implement AR. Research exploring Business Models (BMs) and Revenue Models (RM) for AR in tourism is scarce, and is currently delaying widespread adoption, implementation and exploration of ARs full potential (Cranmer and Jung 2014). To provide insight and progress one step closer to meaningful and wide scale adoption of AR in tourism, this study will identify how ARs potential can be translated into economic value.

### 3 Augmented Reality Revenue Model

BMs play a crucial role in helping secure and expand competitive advantage (Johnson et al. 2008), telling the story of how organisations intend to create and sustain profits (Magretta 2002). BMs focus on creating value and capturing returns from that value (Chesbrough 2007). Stakeholder collaboration is vitally important to successfully implement new technologies (Al-Debei and Avison 2010),

especially in the tourism context which is characterised by large and complex networks (Livi 2008). However, the economic value of AR for tourism is undefined, and as a result, organisations remain unsure how to implement the technology to add value to the visitor experience while generating economic return. The potential to add value by implementing AR is widely researched, but, the majority of studies explore ARs value from a visitor perspective, rather than how it can be adopted to generate profit or create additional revenue. An AR RM is currently missing from research, despite the fact it has been argued “a better business model often will beat a better idea or technology” (Chesbrough 2007, p. 12).

In a study exploring the value creation process of AR at Cultural Heritage (CH) sites, earning profits was identified as the most important outcome of AR implementation from a developers perspective, and “varying business models are currently available on the market” (Tscheu and Buhalis 2016, p. 612). However, no AR specific BMs in a tourism context have been identified within existing research and it remains a clear BM for AR is yet to crystallise (Cranmer and Jung 2014; Kleef et al. 2010).

Nevertheless, Inoue and Sato (2010) propose several potential ways to generate revenue from AR. However, these mainly adapt existing BMs, and are not designed for AR and more specifically the tourism context. On this note, Kleef et al. (2010, p. 4) stated “value is the key concept of a business model, it is what a business trades with its customers”, but suggested in the case of AR, the value is likely to be non-financial. In the context of tourist organisations, often SMEs faced with limited budgets, Tscheu and Buhalis (2016) suggested shared RMs are most suitable, but they do not outline or define how this could work in reality. Therefore, this study will attempt to explore potential RMs for AR implementation, using the case of UNESCO recognised, Geevor Tin Mine Museum, Cornwall.

Geevor is a publically funded organisation, and face increasing pressure to secure additional revenue streams whilst improving the visitor experience and modernising its appeal. Although each CH site is different (Tscheu and Buhalis 2016), the study will identify potential AR RMs, with the aim of providing practical guidelines for practitioners and managers to identify how AR could be implemented to generate financial returns.

## 4 Methods

Geevor was used as a case study to understand the ways in which stakeholders perceived AR could be introduced to improve the visitor offer, while generating revenue. Stakeholder analysis was performed, identifying five stakeholder groups; 9 of Geevors internal stakeholders (G), 6 Tourist Bodies (B), 3 Tertiary groups (T), 2 local Businesses (L) and 30 Visitors (V). In total, 50 semi-structured interviews were conducted with members of these groups, between March 2015 and February 2016. Due to the exploratory nature of the study, a semi-structured interview

approach allowed the freedom to add to and extend questions (Saunders et al. 2012), providing more flexibility and increasing the quality of data (Gillham 2005).

Sampling is often chosen on the basis of employing methods that source respondents to best meet the overall aims of research. Importantly, “the sample must be appropriate and comprise participants who best represent or have knowledge of the research topic” (Elo et al. 2014, p. 4). Therefore, different sampling methods were employed; non-probability sampling was used to interview all stakeholder groups except visitors, where it was more practical to employ convenience sampling. Prior to interviews respondents were shown a short AR video demonstration and provided with an AR information sheet, to ensure their knowledge of AR was proficient to adequately participate in the interview. All interviews were recorded and transcribed and data were analysed using content analysis.

Regarding the profile of visitors, the majority (60%) identified themselves as ‘very much’ or ‘much’ with regard to their technical savviness, suggesting they are regular users of technologies such as smartphones and tablets, and 83% owned a smartphone (and those who did not often said they had a tablet). With regard to all other stakeholders, Table 1 demonstrates internal, tertiary, bodies and business stakeholder profiles including their organisation, position, and prior understanding of AR.

**Table 1** Stakeholder respondent profile

Code	Organisation	Position	Prior knowledge of AR
G1	Geevor	Trustee	Moderate
G2	Geevor	Chair of Trustees	Moderate
G3	Geevor	Marketing Officer	Low
G4	Geevor	Learning Officer	Moderate
G5	Geevor	Mine Development Officer	Low
G6	Geevor	Mine Guide	Low
G7	Geevor	Curator	Low
G8	Geevor	IT Manager	High
G9	Geevor	Mine Manager	Moderate
B1	Cornwall Council	Cultural Programme Officer	Moderate
B2	Visit Cornwall	Chief Executive Officer	Moderate
B3	Cornwall Museum Partnership	Chief Executive Officer	Moderate
B4	Cornwall Museum Partnership	Development Officer	Moderate
B5	(Freelance)	Museum Marketing Expert	High
B6	Cornwall National Trust	General Manager	Moderate
T1	University of Falmouth	University lecturer	High
T2	University of Falmouth	University Professor	Moderate
T3	St Ives Secondary School	Secondary school teacher	Moderate
LB1	Count House café	Assistant Manager	Moderate
LB2	Geevor Shop	General Manager	Low

## 5 Findings

### 5.1 *Secondary Revenue Generation*

Stakeholders strongly believed AR could be used to generate secondary revenue, through increased spend both on-site and in the local area, resulting from increased customer retention. It was considered the more time visitors spent on site, using and enjoying AR, the more likely they would be to spend money, such as staying to enjoy lunch in the café or having afternoon tea. In this way, LB1 hoped AR would encourage visitors to “come to Geevor for the day...I am trying to get double sale or tripe sales”. It is believed AR would give visitors more to do, while enhancing their experience and therefore enjoyment. In turn this would increase the time they spent on site and thus likelihood to visit the café for refreshments.

Similarly, with regard to the on-site shop, stakeholders suggested AR would increase visitors’ engagement and understanding of the exhibits, therefore increasing their likelihood to purchase items, such as books in the shop to continue and improve their learning experience. It was considered AR would help strengthen the connection between the museum experience and the products for sale in the shop. G7 for instance commented “in the mineral gallery...you could have one small notice saying many of these specimens can be seen and purchased in the shop”. In this way, it was considered AR would link directly to the on-site businesses, encouraging visitors to go in, instead of bypassing them. LB2 extended this further, suggesting advertising products throughout the museum experience would not only help drive traffic, retain customers and increase sales, but also increase awareness and interest in local traditions and customs. Stakeholders felt if used in this way would be particularly beneficial during low season when the site is quietest, to help combat issues associated with seasonality and customer retention. However, it was acknowledged AR would have to be subtle, careful not to interfere with, or detract from the exhibits.

Stakeholders identified one of Geevors challenges is that visitors underestimate the scale, scope and range of activities offered and often spend longer on site than anticipated. Thus, using AR, G8 and B2 felt people would be more likely to stay even longer because they would appreciate the scale of the attraction. B2 summarised “it is about eating more, drinking more and spending more” suggesting AR would extend visitors dwell time. Equally, B4 pointed out that AR would extend the visitor offer, and likelihood for visitors to spend longer on site, which increases the perception of value for money and therefore again increase their likelihood to spend more in the café and shop. Likewise, B2 claimed if more visitors are coming, staying longer and spending more money it will create a positive change, and increase revenues. These ideas are also mirrored by V22 who said as a visitor, if the experience is more engaging it would increase the likelihood of spending longer on site.

## **5.2 *Marketing Tool***

The marketing potential and merits of AR are much discussed within literature, however the use of AR to increase profits has not been previously examined. Stakeholders strongly acknowledged ARs potential to increase Geevors marketing presence, raising the profile of the site and on a larger scale, Cornwall as a tourist destination. Thus, also attracting more visitors who would spend more at Geevor and locally (T2). In this way, AR could give Geevor competitive edge, while helping to attract less specialist and more generalist audiences as well as appeal to younger target groups. Importantly, B5 recognised that if you are doing something for younger markets, you are also doing something to benefit older markets, because they “share the same barriers”.

Stakeholders acknowledged simply offering AR would be valuable and drive visits from individuals interested in trying the new technology. In this way, AR could therefore help “seal the deal”, influencing and confirming visitors’ decision to go to Geevor. B1 suggested AR would attract more visitors, anticipating a good visitor experience thinking “oh that sounds a bit different, I am going to try that out”. B1 and G2 perceived, this would have a significant impact on word-of-mouth marketing and recommendations, in turn attracting more people to visit. This is exemplified by V3, V4, V25 and V28 who all claimed they would recommend Geevor, if the AR app provided an enhanced experience.

One of Geevors’ key challenges is a lack of funding, therefore if AR had the potential to demonstrate site advancement, innovation and improvement indirectly attracting funders, this would be extremely valuable to Geevor (B3, LB2). In addition, B2 identified the benefit of AR is that it would offer the media something “new” to promote. B5 and G3 also thought AR would increase visitors’ likelihood to share their experiences on social media platforms, which would again raise Geevors profile and attract wider audiences. T2 noted that society is used to instant sharing, and AR should inspire photo sharing, or what people thought of the experience to inspire higher visitor numbers “based on new visits rather than repeat visits”. G3 adds this would help increase Geevors online marketing presence. Although T2 raised concern that if some sort of AR experience was available pre-visit, it may have a negative impact and discourage people from actually visiting, because they would feel they had seen it all. But, nevertheless recognised AR would be a good way to potentially increase site engagement and drive visits. AR would however be effective at providing a “wow” factor (G2) incorporated into marketing materials to increase visitor numbers.

## **5.3 *AR Free or Fee***

A number of considerations arose during interviews. One of the main debates centred around the best and most effective RM to introduce AR at Geevor.

Stakeholders were of two minds about whether AR should be offered for free, as part of Geevor trying to better the visitor experience or alternatively whether AR be offered as an extra, at an additional fee to the entry cost. Even among stakeholders who felt AR should be charged at a fee, the amount varied. Out of 30 visitors interviewed, just over half said they would be willing to pay between £1 and £5 to use AR, believing it would make the visit more interesting, entertaining and educational. Although, no ideal cost for AR was identified. Some visitors claimed to have paid for audio guides at other attractions, so paying to use AR would be no different. Most stakeholders agreed that audio guides prove visitors' willingness to pay to have "a bit more information at their fingertips" (B1) and thus would make sense to have a fee attached. However, it was also proposed that the fee could vary at different times of the year and for different target segments.

On the other hand, just under half of visitors argued they would not be willing to pay a fee to use AR, and it should be offered free as part of Geevor trying to deepen and broaden the visitor experience, bettering itself. Of these, some suggested however, that if the entry fee increased slightly to cover the costs of AR it would not cause concern. One of the main reasons visitors objected to paying a fee for AR is worry about Geevor becoming too expensive for families, as well as visitors feeling they have to use AR because they have paid for it. This clearly shows that there is no agreement about costs involved in using AR at CH attractions thus, proper research is required to ensure that visitors' willingness to pay is fully understood and appropriate strategies adopted.

## 5.4 *Own or Loan Devices*

Another debate arising from interviews related to AR pricing structure; whether visitors should have their own devices or if Geevor would provide devices for visitors to loan. Yet, irrespective of the choice made, both could potentially generate revenue. Firstly, if visitors used their own devices Geevor could introduce a charge to download the AR application. Secondly, if Geevor loaned devices to visitors, they could demand a hire fee and deposit. However, both options introduce financial implications, such as buying and maintaining enough devices to loan to visitors. Equally both options have barriers, for example if visitors used their own devices, it would be based on the assumption all visitors have an AR enabled device, that is fully charged, has enough memory, sufficient connectivity and power to efficiently run the AR application. Visitors without their own AR capable devices would miss out on the experience.

On the other hand, if Geevor were to loan devices, stakeholder recognised the long-term commitment and investment it would involve and issues surrounding security and preventative measures to ensure devices are returned. However, deposit schemes, pre booking devices and tracking devices were proposed by stakeholders as a resolution to such barriers. Visitors largely favoured the idea of



loaning devices, claiming they would be willing to pay more to hire a device because it would enhance their experience. Whereas if visitors had to use their own devices, paying to pay to download AR it was considered less favourable.

## 6 Discussion and Conclusions

The aim of this study was to explore and understand potential ways AR can be implemented to generate profit. Despite the many benefits AR presents to tourist organisations such as Geevor, its adoption still involves too many uncertainties and therefore financial risk. Therefore, this study aimed to improve understanding by revealing how AR can be adopted to generate revenue, by identifying a number of ways potential AR RMs. However because the study is conceptual, although it identifies potential profit generation methods, using these methods to earn profit is yet to be researched. Nonetheless, the study bridges a gap within current research. At present, the majority of AR studies identify the potential of AR to add value and enhance experiences, rather than generate profitable and financial value. This study adds to the existing pool of knowledge by exploring financial implications of AR adoption. Fundamentally, business is concerned with creating value and capturing returns from that value (Chesbrough 2007). Although value does not have to be financial, for tourist organisations such as Geevor, it is important investment into and adoption of technologies both enhance the tourist experience and generate revenue (Jung et al. 2015), and earning profits is often considered the most important outcome of AR implementation (Tscheu and Buhalis 2016).

This study reveals a number of potential ways tourist organisations can adopt and implement AR to generate profit. Since this is an underexplored area, the majority of findings have not been previously identified in literature. However, some overlaps with existing research are apparent; for instance stakeholders considered just by offering AR technology, it would broaden and attract wider audiences. This is confirmed by Lashkari et al. (2010) who found technology itself attracts tourists. Similarly, stakeholders identified a number of potential secondary benefits arising from AR implementation that would contribute to increased profits; such as adding value to the visitor experience, increasing and extending the learning experience, as well as providing entertainment and sociability. Such benefits of AR have been previously identified in literature (e.g. Chung et al. 2015; Kounavis et al. 2012; Palumbo et al. 2013), but this study extends understanding identifying how these benefits can contribute to increase profit generation. Stakeholders perceived if visitors have a better experience using AR, they are likely to stay longer on site which would increase their likelihood to spend more money in the café or make a purchase in the shop. In turn, this would create a better reputation for Geevor, broadening the target market, while attracting more visitors, increasing ticket sales and use of local infrastructure, as well as creating more money to invest back into the area. Although previous studies such as Yovcheva et al. (2013) discuss the marketing potentials of AR, they do not examine how it could generate revenue.

Again, interview findings extend understanding; suggesting AR would raise the profile of the site and Cornwall as a tourist destination, increasing visitor numbers, creating a good reputation for the area and enhancing competitiveness.

In addition to this, interviews revealed two debates, firstly should AR be offered free or for a fee? Secondly, should visitors bring their own devices or should Geevor loan AR enabled devices? There was a divide of opinion and although no clear answer was established, the study generates questions that require answers if, and before, AR is to be successfully and sustainably implemented by tourist organisations. For many SMEs, the pressure to adopt and invest in modern technologies increases daily (Han et al. 2014; Jung et al. 2015; Tscheu and Buhalis 2016), but at present there remain too many uncertainties and therefore financial risk. The creation and examination of such ‘own or loan’, ‘free or fee’ debates create platforms for discussion and demonstrate the need for further research, as well as providing questions for managers and practitioners considering AR adoption to answer. Therefore, not only does this study extend the existing pool of knowledge and move AR one step closer to meaningful implementation by outlining potential profit generation. It also provides both practitioners and managers with a number of considerations and potential paths to pursue to implement AR to generate a profit, thus minimising financial risk.

This study has a number of limitations and recommendations for future research. The findings are based solely on a case study of Geevor Tin Mine Museum, therefore minimising their generalisability. Nonetheless, the study identified a number of potential ways to implement AR within tourist organisations to generate profit, however the findings are in no way complete and it is recommended further studies are conducted and the financial outcomes of actual implementation reported. Nevertheless, the study provides insight, of which provide a greater understanding of ARs profit generating potential, thus offering managers and practitioners to learn from and share from the findings.

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Augmented Reality and Virtual Reality  
Empowering Human, Place and Business

Jung, T.; tom Dieck, M.C. (Eds.)

2018, XI, 384 p. 87 illus., 8 illus. in color., Hardcover

ISBN: 978-3-319-64026-6