Developing Augmented Reality Business Models for SMEs in Tourism

Abstract:

Augmented reality (AR) is disrupting the business landscape. Small and medium-sized enterprises (SMEs) often face challenges capitalising on the potential presented by cutting-edge technologies, such as AR. Business models (BMs) are widely regarded as effective management tools, which help increase competitiveness. This paper aims to develop an augmented reality business model (ARBM), using a case study of a small UNESCO visitor attraction. A multimethod approach is used, including stakeholder analysis, in-depth interviews and analytic hierarchy process (AHP) modelling. The proposed ARBM consists of five themes: existing resources, AR value, stakeholder benefits, implementation and revenue generation, which are guided by the principles of sustainability, inclusivity, suitability, flexibility and transparency. The findings provide important insights into how SMEs can implement AR to exploit its potential.

Keywords: *Augmented Reality, Business Models, SMEs, Innovation*

1. Introduction

The business potential of augmented reality (AR) remains unrealised in many contexts, despite growing consumer interest. The success of Pokémon GO in 2016 exposed AR to a mass audience, increasing recognition of its potential and propelling it to become "one of the most revolutionary inventions in recent years" (He et al., 2018: 127). Crucially, the popularity of Pokémon Go illustrated consumer use of AR applications is driven by attitude of use, specifically positive association with enjoyment and gratifications, which in turn influence likelihood to make in-application purchases (Rauschnabel et al., 2017). Predictions suggest the AR market will reach $118 billion by 2022, with an annual growth rate of 75.72% (Forbes, 2017). AR provides users with an enhanced view, supplementing their environment with digital content, such as graphics, sound and videos, which facilitate seamless integration between physical and virtual worlds (Flavián et al., 2019). As well as enhancing real-world experiences, AR can also remove objects from view, which presents numerous opportunities to add value, such as replacing physical products, influencing customer behaviour and improving product visualisation (Dwivedi et al., 2020). Based on these characteristics, AR has been widely praised for its ability to create richer, more immersive content, enhancing interaction with, and perceptions of the world around us. Rauschnabel (2021) referred to AR as a disruptive

technology. However, AR usage has been much slower than anticipated; costs, lack of awareness and uncertainty of how to adopt are delaying widespread implementation (Tussyadiah et al., 2018).

Business models (BMs) are critical constructs to help understand how organisations generate, deliver and capture value, whilst reflecting organisational strategy (Arbussa and Marquès, 2017). BMs are seen as effective tools to commercialise, explore new ideas and technologies (Chen et al., 2020). Technological innovations, such as AR provide new opportunities and possibilities to create and capture value (Westerman and Bonnet, 2014). In line with this, BMs are considered a prerequisite to unlock the "latent value from a technology" (Chesbrough and Rosenbloom, 2002: 529). However, it has been suggested that technology does not succeed by itself, but requires a consistent organisational setting with a clear BM to provide value to intended users (Al-Debei and Avison, 2010). In response to an increasing pressure on organisations to innovate through the integration of technologies, interest in the potential of BMs to create and capture value has intensified (Chen et al., 2020; Teece, 2010; Zott et al., 2010).

Small and medium-sized enterprises (SMEs) have particular challenges when encountering new technologies. The Office of National Statistics reported a significant gap between the successful integration of technologies in SMEs and larger organisations (ONS, 2014). In a recent study, Miller et al. (2020: 620) highlight that there is currently "limited research exploring the key defining features of SMEs business models and approaches to business model innovation within SMEs". Hence, the impact of SMEs' inherent characteristics, such as small size and limited resources remain underexplored in the BM context (Miller et al., 2020; Neirotti and Raguseo, 2017; Rana et al., 2019; Rispal and Servantie, 2017). The number of SMEs capitalising on the potential of AR technology remains low. Given the importance of innovative technologies for SMEs, this study aims to develop a BM to support SME visitor attractions in the adoption of AR, by addressing the following research questions:

RQ1: What are the key themes and principles of an augmented reality business model (ARBM) in the SME tourism context?
RQ2: How to validate the ARBM for application in the SME tourism context?
RQ3: How do the inherent characteristics of SMEs influence a BM for adoption of AR?

To address these research questions, our paper proceeds as follows. In Section 2, we present a review of literature on SMEs and technology, BMs, AR and tourism. In Section 3, we explain the methodology for our multimethod case study which developed and validated our ARBM. In Section 4, we present the key themes of the ARBM, based on 50 stakeholder interviews, and present the validation of the ARBM. In Section 5, we discuss the findings in the light of current BM literature. Finally, in Section 6, we draw some key theoretical and practical implications about the use of BMs by SMEs to foster innovation using new technologies.

2. Literature Review

2.1 SMEs and Technology

SMEs represent 99% of all businesses in the UK, numbering 5.7 million in 2018 (Rhodes, 2018). "The contribution SMEs make to employment and value creation is undeniable" (Arbussa and Marquès, 2017: 273). SMEs are fundamental to the global economy and play a vital role in economic growth and employment (Chan et al., 2018). Globalisation and rapid technological change have increased pressure on SMEs to adopt innovative technologies to improve growth, competitiveness, productivity, efficiency, reduce costs and attract new customers by meeting changing market needs (Ashurst et al., 2011; Limaj and Bernroider, 2019; Nugroho et al., 2017; Valaei et al., 2017). Sunday et al. (2013) claim SMEs sustained success is directly related to their ability to adopt emerging technologies. However, a number of factors currently inhibit SME's ability to implement technologies, such as organisational structure, technology readiness (Child et al., 2017; Giotopoulos et al., 2017), resources (Krishnamoorthi and Mathew, 2018), lack of business strategy or expertise (Blackburn et al., 2013; Miller et al., 2020) and technology-related competencies (Ashurst et al., 2011; Jones et al., 2014). SMEs also have complex funding structures, lower financial capabilities and abilities to raise funds (Arbussa and Marquès, 2017; Neirotti and Raguseo, 2017). As a result, "IT adoption in small businesses are low, and failure rates are high: the question is why" (Nugroho et al. 2017: 332). Whilst the literature acknowledges a need for SMEs to exploit technical potential by innovating their BMs, it remains unclear what changes and capabilities are required to effectively do so (Chen et al., 2020; Guo et al., 2016; Miller et al., 2020; Morgan-Thomas, 2015). In particular, "there has been little research on the factors inducing SMEs to introduce information technology" (Arbussa and Marquès, 2017: 275).

Due to their small size, SMEs often have a flat structure and an organisational culture influenced by managements' attitude, personality, values, knowledge and communication

skills (Arbussa and Marquès, 2017; Blackburn et al., 2013). Therefore, SME managers' characteristics and understanding of technologies influences likelihood to adopt and levels of success (Asemokha et al., 2019; Guo et al., 2016; Neirotti and Raguseo, 2017). As such, it is essential that "small business owners/managers understand the purpose of the IT to be adopted; the goals, aims, and objectives" (Nugroho et al., 2017: 333). Without the guidance of a BM, it remains a challenge for SMEs to identify the potential impact of technologies on their key activities and crucially develop capabilities to exploit their potential. Hence, it is not always clear whether SMEs consider technologies as an opportunity or threat (Nugroho et al., 2017), and SMEs often have heightened expectations of technology, and at the same time express high levels of perceived risk and caution toward technology adoption (Rana et al., 2019; Rispal and Servantie, 2017). SME technology implementation often happens without proper planning, contributing to higher failure rates (Giotopalos et al., 2017; ONS, 2014). These factors, coupled with SME-inherent characteristics, mean that in practice, SMEs encounter a number of barriers to technology adoption compared with their larger counterparts. Nugroho et al. (2017: 331) suggest that "a disconnection between vision and execution" also contributes to the high number of failed technology adoptions in SMEs. Demil and Lecocq (2015) recommend to improve success when innovating their BMs, SME managers should maintain consistency between their strategic goals and core components of their BM. SMEs that are able to align their processes and innovate their BM, through an innovative mindset, often outperform those who do not (Chan et al., 2018; Krishnamoorthi and Mathew, 2018).

Whilst larger organisations have the ability to take greater risks and the advantage of economies of scale, SMEs have some advantages over larger firms, such as flatter hierarchies, fewer institutional, legal, regulatory and government pressures and opportunities to forge better relationships with stakeholders (Arbussa and Marquès, 2017). This affords SMEs greater agility and flexibility to quickly adjust their BMs in response to new opportunities (Chan et al., 2018; Valaei et al., 2017). However, existing BM research primarily focusses on larger organisations' ability to implement emerging technologies (Arbussa and Marquès, 2017; Child et al., 2017; Miller et al., 2020). There has been a general lack of application of BM concepts in the SME context (Demil and Lecoq, 2015), an exploration of how SMEs can innovate their BMs (Heikkilä et al., 2018), or exploration of how SMEs can use BMs to exploit their resources to gain competitive advantage (Miller et al., 2020). Whilst Arbussa and Marquès (2017: 272) highlight that "literature on BMs finds significant differences between SMEs and large companies". It remains the case that limited research has examined the applicability of the BM

concept as a tool to help SMEs capitalise on the potential presented by new technologies (Miller et al., 2020). Further research is necessary to understand the dynamic nature of SME technology adoption, and help SMEs leverage their flexibility and agility to exploit the opportunities offered by technologies.

2.2 Business Models

Managers of financially successful companies place twice as much importance on their BM compared with less financially successful organisations (Wirtz et al., 2016). Despite the absence of a common theoretical framework, BMs are widely accepted as a tool to help organisations commercialise new technologies, innovate, and exploit new opportunities through the creation and capture of value (Dubosson-Torbay et al., 2002; Shafer et al., 2005; Teece, 2010). Westerman and Bonnet (2014: 74) claimed "executives in every industry must be awake to the opportunities and threats of rapid digital evolution and be ready to reinvent business models as needed". A number of BMs have been developed in the past decades, such as the eBusiness model (Dubosson-Torbay et al., 2002), B4U model (Faber et al., 2003), business model canvas (Osterwalder et al., 2010) and V4 model (Al-Debei and Avison, 2010), and applied in various sectors. Numerous studies also examine key BM components (e.g. Wirtz et al., 2016; Zott et al., 2010).

In the SME context, Arbussa and Marquès (2017: 271) define BMs as an "organisation's meaningful activity system through which their mission is accomplished". BMs are effective tools to support an organisation's stability whilst navigating daily activities (Foss and Saebi, 2017). However, for SMEs to stay competitive and achieve sustained value creation, their BM must change over time (Asemokha et al., 2019; Westerman and Bonnet, 2014). Innovating existing BMs allows SMEs to take advantage of new value creation opportunities, such as adopting emerging technologies (Ashurst et al., 2011; Basile and Faraci, 2015; Wirtz et al., 2016), and identify ways to use new technological capabilities to fulfil unmet new or existing customer needs (Westerman and Bonnet, 2014). Yet, despite interest in BM innovation and SME's sustained competitiveness, the two research streams are often examined in isolation (Asemokha et al., 2019). SMEs remain unclear how to innovate or improve their BMs to develop capabilities to add value (Heikkilä et al., 2018; Miller et al., 2020; Westerman and Bonnet, 2014).

The detailed development of BMs in the SME context has received limited academic attention, and as a result, there is uncertainty toward the role and potential of BMs for SMEs to create added value through innovative technologies (Child et al., 2017; Jones et al., 2014; Miller et al., 2020). Literature to date has predominantly focussed on the use of BMs to assist larger organisations to develop capabilities to integrate technologies (Demil and Lecoq, 2015; Miller et al., 2020). Although previous studies have explored the BM concept in an SME context (e.g. Arbussa and Marquès, 2017; Chen et al., 2020; Child et al., 2017; Cucculelli and Bettinelli, 2015, Jones et al., 2014), research focussing on BMs for the SME visitor economy is limited, especially for immersive technologies, such as AR. Importantly, the impact of SMEs unique characteristics remain underexplored in relation to the BM concept (Miller et al., 2020; Nugroho et al., 2017; Rispal and Servantie, 2017). In acknowledgement of increased pressure on SME visitor attractions to introduce new technologies, and develop capabilities to adopt immersive technologies, there is a real need to develop a BM to help SMEs take advantage and explore BMs in this area. To bridge this gap, and to further understand how to overcome barriers to technology implementation encountered by SMEs, this paper proposes a BM for AR in SMEs.

2.3 Augmented Reality in Tourism

In the face of decreased funding, small visitor attractions experience increasing pressure to survive, and have begun to explore new ways to generate additional revenue through the implementation of innovative technologies, such as AR (Heimo et al., 2016). Use of technologies in our daily lives have "spilled-over" into our leisure and tourism experiences (Wang et al., 2016), and nowadays "technology and digital media increasingly mediate tourist experiences" (Tussyadiah et al., 2018: 605). Nowadays, tourists demand "more personal, unique and memorable experiences, which require a deeper engagement and a multi-sensory stimulation" (Xu et al., 2017: 247). Immersive, interactive and diverse experiences are expected (Han et al., 2018). Technologies, such as AR, create opportunities to create immersive experiences to address the changing needs of the modern visitor (Dwivedi et al., 2020; Tussyadiah et al., 2018). AR enables virtual information to be superimposed onto the real world, without compromising it (Han et al., 2018), integrating physical and virtual objects into reality to create enhanced experiences (Flavián et al., 2019).

Previous tourism studies have explored AR in a range of visitor attractions, such as museums (Moorhouse et al., 2019), art galleries (tom Dieck et al., 2016), theme parks (Jung et al., 2015),

urban attractions (Jung and Han, 2014; Han and Jung, 2018) and UNESCO sites (Obeidy et al., 2018). tom Dieck et al. (2018) investigated AR as a promising tool to attract usually non-engaged audiences and maintain visitor engagement. AR has also been found to boost tourists' attitude towards destinations and attractions (Chung et al., 2018), enable tourists to experience products and places in novel ways (Wei, 2019) and create opportunities for tourism attractions to improve their communication and marketing to extend their offering (Dwivedi et al., 2020; Rauschnabel, 2021). For example, Rauschnabel (2021) proposed AR will disrupt marketing, and represents an important strategic tool, which will enable organisations to substitute real-world physical objects with AR, and in doing so, create enhanced product/service visualisations to inspire customers and improve the effectiveness and impact of marketing messages. Such studies illustrate AR has the potential to create number of benefits, for example, increased tourist engagement, entertainment and competitiveness. Yet, despite this potential, AR remains under-utilised by SMEs in the visitor economy.

There is no doubt that AR offers numerous ways to create value-added value propositions (Dwivedi et al., 2020; Flavián et al., 2019), which are considered one way to ensure the future success and competitive advantage of visitor attractions (Han and Jung, 2018; Obeidy et al., 2018). In the tourism context, there remains a need to further investigate how AR "will benefit consumers, industry and other stakeholders, and think about specific value propositions that can be realised through meaningful design" (Han et al., 2018: 115). Due to high levels of competition in the tourism sector, and the added complexities of inherent characteristics, such as limited funding, knowledge and resources, this is particularly important for SME visitor attractions (Ukpabi and Karjaluoto, 2016). At present, high failure rates and perceived barriers present too much risk without prior proof of concept, thus Jung and tom Dieck (2017: 11) called for the development of "a suitable business model for the investment and implementation of multiple technologies" in the SME tourism economy context.

3 Methodology

3.1 Case Study Context

This study focuses on a small UNESCO-recognised visitor attraction in the UK, keen to explore the use of technologies as a way to create an enhanced visitor experience, whilst alleviating some of their recognised barriers (e.g. seasonality, funding limitations). As a council-owned, publicly funded venture, remaining economically viable is a key concern for the attraction (Coupland and Coupland, 2014). Given that technology adoption in SMEs is an ongoing

process, involving a range of stakeholders, it was crucial to gain stakeholder support to ensure long-term success (Sunday et al., 2013). Similarly, BM studies identify a need to focus beyond the internal organisation, involving customers and wider networks (e.g. Demil and Lecocq, 2015; Gutiérrez-Leefmans and Holland, 2019). Therefore, to improve success, we employed a stakeholder approach whilst developing the ARBM, to address the needs of all stakeholders and minimise any potential conflicts.

Contrary to critique that case studies do not support generalisation (Xiao and Smith, 2006), theoretical generalisation from case studies has become an increasingly "popular and relevant research strategy that forms the basis of a disproportionately large number of influential studies" (Eisenhardt and Grebner, 2007: 30). Rather than viewing generalisability as a hindrance, Kochan and Rubinstein (2000: 1535) proposed case studies should be judged "on the basis of transferability and comparability" of which findings can be transferred to other contexts. Case studies are proven to offer significant value in revealing insights to increase understanding (Yin, 2009) and crucially encompass the multiplicity of perspectives rooted in a specific context (Ritchie et al., 2013). Therefore, theoretical generalisation "far from minimising case studies' offer, in fact, free it to offer something different and distinctive" (Thomas, 2011: 21). To build theory, studies typically combine multimethods. "Triangulation made possible by multiple data collection methods provides stronger substantiation" particularly when combining qualitative and quantitative methods (Eisenhardt, 1989, p.538). This multimethod case study had two phases (see Figure 1). First, stakeholder interviews were carried out to inform the development of the ARBM. Second, the developed ARBM was validated with surveys using the analytic hierarchy process (AHP) method. Specifically, phase 2 quantitative data bolstered and thus "corroborated findings from qualitative evidence" from phase 1 (Eisenhardt, 1989: 538).

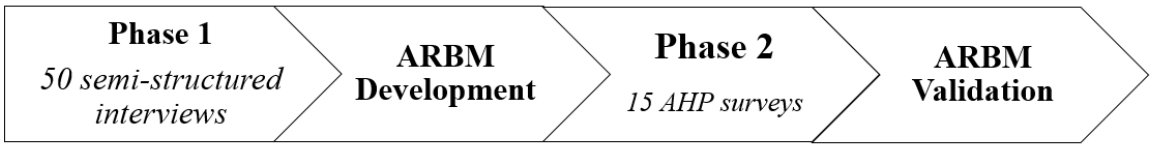

Figure 1 Data collection process

3.2 Data Collection and Analysis: Phase 1

Stakeholder analysis of the visitor attraction revealed five stakeholder groups; internal stakeholders, local authorities, tertiary groups, local businesses and visitors (see Appendix A and B). Fifty semi-structured interviews were conducted with members of these groups, from

January to March 2016. (Whilst we acknowledge that the data were collected five years ago, we argue it is still a very relevant dataset. Firstly, the fact that there are still no successful implementation case studies of AR in an SME setting in the literature underlines the importance of our study. Secondly, there is still a need for a more detailed understanding of the steps needed for successful implementation of AR using a BM is required, and our study supplies this understanding.)

As suggested by Kumar (2011), to ensure consistency, validity and reliability, interviews were conducted by one interviewer. Visitor interviews lasted between 20 and 40 minutes, whereas interviews with other stakeholder groups lasted between 40 and 75 minutes. Non-probability, purposive sampling was used to interview all stakeholder groups, apart from visitors where it was most practical to employ convenience sampling. These methods provided the best fit to collect the richest data (Bryman and Bell, 2015). Interview questions were formulated using previous BM literature (e.g. Al-Debei and Avison, 2010; Osterwalder et al., 2010; Zott et al., 2010). For example, in relation to the BM value proposition interview questions included; in what ways do you think AR could add value, how do you think implementing AR could help improve the organisation and how do you perceive AR could help improve revenue (see Appendix C for interview schemes).

Prior to interviews, respondents were shown a short AR demonstration and given an information sheet to ensure their knowledge of AR was proficient to participate in interview. All interviews were recorded and transcribed; data were analysed using thematic analysis. This helped reduce the large volume of data without losing context and provide focus for interpretation (Bryman and Bell, 2015). Following Lapadat's (2010) systematic approach to thematic analysis, we first coded data according to themes, then examined the themes for relationships and commonalities. To increase reliability and consistency, as suggested by Prayag and Ryan (2011), two authors analysed then cross-checked the transcripts to agree and identify themes and sub-themes, as well as generate new emergent themes, such as the ARBM principles. NVivo was used to assist data analysis, increasing rigor and facilitating theory-building capabilities (Lapadat, 2010).

3.3 Data Collection and Analysis: Phase 2

The ARBM was developed from themes and sub-themes identified in Phase 1 (see Table 1). To validate the ARBM for application in the SME context, 15 stakeholder surveys were

conducted and were analysed using AHP. AHP is a methodology to reduce conflicting priorities amongst stakeholders, organising often-conflicting opinion into a hierarchy of importance to create a unified group decision (Goepel, 2013). Simply, AHP produces a group decision where decision-makers (e.g. stakeholders) make judgements which are aggregated and the degree of importance of each alternative quantified (Sato, 2009). AHP has strong proof of concept in a range of previous research settings, commonly employed as a tool to combine individual judgements from an entire group (Saaty, 2008).

AHP analysis consists of seven steps: producing a hierarchy, pairwise comparisons, comparisons matrix, eigenvector, consistency ratio (CR), ratings and integrated group judgement Saaty, 2008). No optimal sample size is recommended; rather, the ideal sample is dependent on the research questions under investigation and whether the sample is appropriate and representative in the research context (Qureshi and Harrison, 2003). To facilitate analysis, BPMSG software was used to calculate pairwise comparisons and present a unified stakeholder judgement (see Table 2). CR calculations were performed to identify any inconsistencies amongst stakeholder judgements. All results returned a CR below 0.1 confirming valid consistency (Goepel, 2013).

AHP aggregated the diverse perceptions of 15 stakeholders, to determine the most important sub-themes for each of the five ARBM themes. Crucially, AHP provided a formal structure to enable stakeholders to make simpler judgments, whilst providing a rationale for each choice (Goodwin and Wright, 2004). Twenty stakeholders who participated in Phase 1 were invited to complete the survey, and of those, ten internal and five external stakeholders completed the survey.

4 Findings

4.1 Phase 1

Five key themes for the ARBM emerged from Phase 1 stakeholder interviews: existing resources, AR value, stakeholder benefits, AR implementation and revenue generation. These are elaborated on below.

Existing Resources

To adopt an innovative technology, such as AR, existing resources have to be considered since these will need to be leveraged in order to gain value. Indeed, this is a component of most BM

processes. The creation of visitor experiences depends on the provision of existing, often intangible resources, such as the first-hand knowledge of staff. To understand how AR could add additional value, stakeholders established a need to first identify the value in existing resources. Five existing resources emerged as sub-themes: uniqueness, range of activities, education, staff and heritage significance. Discussing the importance of the existing unique visitor offer, internal stakeholder A8 commented that "*everything is here, including the people, I used to work here myself too as a miner, we have all that extra value, of real people*". LA3 added that staff allow visitors to "*look through the eyes of someone who worked there … that is evocative and brings out those personal, human stories*".

The uniqueness of the site was also recognised as a key value. LB1 described that the attraction represents "*an untouched piece of history*", LA1 strengthened the "*historical value in unparalleled*". LA6 added that the site "*evokes that feeling of you are back in 1990, and what it would have been like to be in the guy's shoes*". Without understanding the value of the existing offering, stakeholders recognised a challenge in identifying how AR could add value. The identification of intangible resources, such as the first-hand experience of staff who had worked in the mine is a good example of this; AR technology can bring experiences to life.

AR Value

Considering SME's inherent characteristics of smallness and limited resources, understanding stakeholders' perceptions toward the value of AR was crucial to BM design. There was agreement AR would add significant value to existing resources, for example, attracting additional target segments (e.g. generalist not specialist visitors, younger audiences) and better meeting the needs of the modern "*non-traditional museum*" (LA4) visitor. Stakeholders highlighted a need to add to, not detract from existing resources, noting AR must complement existing strategic objectives, rather than replace any.

Several AR value sub-themes emerged, including: monetary benefits, improved interpretation, education, long-term value, marketing, navigation and gamification. Use of AR to create personalised tours received much discussion, given its potential to overcome existing challenges faced by the visitor attraction guides. It was suggested that AR could help "*tailor tours to the needs of mixed audience*" (A1) as well as enabling visitors to "*see and really experience history*" (V2). LA6 thought AR would "*bring to life an industry that effectively doesn't work anymore, making it work in the eyes of the visitors*". A8 described difficulties in

maintaining visitors' attention, whilst providing an interesting and educational experience, suggesting AR would allow "*visitors will be looked after a bit better … AR is the prefect substitute for real people*". A6 agreed AR would "*help keep their attention and enhance what they understand*".

Moreover, adopting AR was perceived as a way to increase long-term value and interpretation of the site, avoiding having to "*litter the site with big interpretation panels*" (LA2), instead introducing AR "*virtual signage*" (LA6). In the same way, A5 noted "*the beauty of AR is that you can leave it in its preserved state*". Furthermore, the attractions on site food business saw potential to use AR to link directly to "*what we offer in terms of food ... so instead of bypassing us, people think, oh wow, they are actually making pasties like they did 100 years ago*" (LB1). In this way, AR was recognised as a way to increase revenue generation and customer retention "*you extend the dwell time, you extend the ability for people to eat more, drink more and spend more*" (LA2).

Stakeholder Benefits

To encourage support amongst stakeholders, and increase AR adoption success, stakeholders identified five sub-themes of stakeholder benefits: preserving knowledge, securing employment, improving efficiency (e.g. performing daily tasks and communication), strengthening community pride and helping attract investment. The role of AR to preserve existing knowledge emerged as a key sub-theme. It was revealed AR would maintain the authenticity of the visitor experience whilst preserving the existing knowledge and first-hand experiences of staff. The potential was seen to protect the intangible experience for the enjoyment of future generations; hence, the adoption of AR to preserve knowledge emerged as a key sub-theme. *A5 commented that* "*as the place evolves, our older members of staff, who have knowledge of the place will not be here. So it (AR) can preserve the knowledge*".

Due to their small size, job security is a key concern in many SMEs, AR was seen as a way to improve job security through increased revenue generation. AR was also considered a way to attract further investment, for example, "*it [AR] would make it a place to go and stay and not just drive through. Such benefits demonstrate [name of organisation] are serious about enhancing and adding value to their visitor offer, increasing the likelihood of attracting investment*" (A1). LA6 suggested that "*the better the experience we can give people in the whole area, the more people will visit, and the more the economy will grow and the more money*

you will have to invest back into conservation of those areas". In addition, A9 believed "*it [AR] would certainly raise morale … we would feel as though the site was advancing*" This suggests AR would not only create benefits for stakeholders, improving efficiency and ease of completing tasks and enhancing a sense of pride in the attraction, but also create benefits for the wider community locally. As a public sector SME visitor attraction, stakeholders considered this to be important, and securing investment through improvement and innovation is essential for longevity and future success.

AR Implementation

Again, due to inherent SME characteristics, it was perhaps inevitable that stakeholders expressed initial concern towards the additional roles and responsibilities involved in AR implementation. Six additional AR implementation sub-themes emerged, including: support, development, promotion, maintenance, funding and launch. To ensure the longevity and success of AR adoption, stakeholders recommended that any new roles or responsibilities must be clearly identified, agreed and delegated. LA2 noted the importance of ensuring the visitor attraction had the right technological infrastructure to add value through an enhanced AR experience. LA4 discussed the need to allocate additional workloads to those involved in developing AR content. Similarly, A4 reinforced the need to have a support and a clear implementation strategy to increase success.

Stakeholders unanimously agreed that clear communication and transparency was essential. It was agreed that this would ensure "*AR is sympathetic and fits with what the visitor comes to see*" (A9). LA1 agreed AR would maintain authenticity, avoiding "*Disney-ifying the site*". Identifying the need to gain universal stakeholder support to maintain and promote AR, A1 recommended "*to really sell it, use it and celebrate it everybody would need to have to see its value, and understand its value and see its value for themselves*". Communication was noted as critical to create mutual and shared understanding, reducing resistance to change and shared understanding of ARs benefits (A1, A2, A4, A9 and LB1). Visitor attraction manager (A9) commented that "*there won't be [resistance], as long as there is an understanding from both sides, we are the people who know our customers … working together that way, we will develop things that actually fit the customer*".

Revenue Generation

Revenue generation plays a central role in any business, but is particularly important for publicly funded SMEs reliant on donations and access to funding bodies. In order to justify investments into new technologies, generating additional revenue is crucial. Stakeholders revealed that whilst AR would create a number of non-financial benefits, generating additional revenue streams was also necessary.

Numerous revenue generation sub-themes were suggested: generation of secondary revenue, flexible costs, in-app purchasing, increased entry price, paying to use AR, offering AR for free, visitors using their own devices and paying to hire devices. Whilst no optimal revenue model was agreed, these sub-themes present a number of potential AR revenue generation options. There was much debate around whether the attraction should provide devices for visitors to use, or visitors would use their own devices to access AR. Yet, concerns were raised towards battery life, connectivity and storage issues or alternatively funding and maintaining enough devices to meet visitor demand.

A second key debate emerged, regarding whether visitors should pay to use AR or the costs should be included in an increased priced entry ticket. Whilst some visitors expressed willingness to pay extra if it included other benefits, such as "*a discount in the store*" (V1), or "*these two [children] would get a lot more from it, which means ultimately us as a family would get a lot more from it*" (V7). Other stakeholders thought AR costs should be absorbed as part as part of the attraction "*being able to make itself better than it is now*" (V7). LA1 thought the success of audio guides proves visitors' willingness to pay for an enhanced experience, demonstrating "*people are willing to pay a bit more to have a little bit more at their fingertips*". Overall, there was much discussion of potential AR revenue generation options, and although no optimal revenue generation option emerged, the sub-themes confirm there are a number of ways AR can be implemented for potential financial benefit.

Table 1 presents a summary of Phase 1 findings, presenting the five ARBM themes and associated sub-themes.

Table 1 ARBM Themes and Sub-themes

Themes	Sub-Themes	Description
Existing Resources	Uniqueness	Site is preserved, untouched piece of history
	Range of activities	Variety of activities available to cater to different visitors/interests
	Education	Provision of immersive learning experience and resources

	Staff	Staff have first-hand knowledge/experiences. Dedicated and committed team
	Heritage Significance	Preserve, protect heritage, reinforcing local traditions and identity
AR Value	Monetary benefits	Increase visitor numbers, ticket sales, spend locally and in on-site
	Interpretation	Brings the site to life, tailoring content to different knowledge levels, improve accessibility
	Education	Appeal to different learning styles. Improve engagement and excitement
	Long-term value	Continuation of the visitor experience for future generations. Protection of environment
	Marketing	Raise the profile of attraction and local area. Increase visibility of promotional material
	Navigation	Create an interactive AR map, to help navigation of site
	Games	Combine education and entertainment, creating personalised experiences
Stakeholder Benefits	Secure jobs	Secure jobs through increased visitor numbers and revenues
	Preserve knowledge	Recording forever the first-hand knowledge of remaining miners
	Improve efficiency	Improve efficiency of performing daily tasks
	Community pride	Educate visitors about heritage to increase community pride
	Attract investment	Attract funding and investment by demonstrating advancement
AR Implementation	Supporting	Provide guidance before, during, and after, AR implementation
	Developing	Create content, prototype, test and develop AR
	Promoting	Market/advertise AR
	Maintaining	Maintain AR for long-term provision
	Funding	Secure and allocate funding to develop, launch and maintain AR
	Launching	Implement AR across site, train and help staff use AR
Revenue Generation	Secondary revenue	Revenue from secondary sources (e.g. spend locally)
	Flexible costs	AR cost flexible and varies for different times, days, months and groups
	In-app purchasing	Basic version of AR free, additional fee to use extra features (e.g. tour)
	Increased entry price	Entry price increased to absorbs costs of AR
	Pay to use AR	Visitors pay to download and use AR
	AR free	Attraction cover all costs associated with AR adoption
	Visitors bring devices	Free to use, but visitors must bring own devices
	Pay to hire devices	Visitors pay to hire devices to use AR

ARBM Principles

During interviews, an additional set of key principles for any ARBM emerged. Whilst the researchers did not set out to identify BM principles, it became clear during data analysis that stakeholders were keen to emphasise general principles, and the five principles emerged as a result of data and concept saturation. Stakeholders proposed that addressing each BM principle would increase success and longevity of AR adoption and BM success. These sub-themes can be seen through the prism of SMEs' inherent characteristics of smallness and limited resources. Five general BM principles emerged: suitability, inclusivity, transparency, flexibility and sustainability.

Suitability was particularly important to SMEs who cannot afford to experiment with technology and need it to work first time. A6 confirmed that "*if the costs are low and the risks are low then yeah, go for it, as long as it is not conflicting with anything we are already doing*". LA4 emphasised establishing the suitability of AR as an innovation to enhance the visitor experience, "*AR needs to be about ease of steps … make it so they [visitors] don't have to ask that question, or make them feel more comfortable asking that question*". Suitability is centred on the need to appropriately complement the existing offer.

Inclusivity was also considered important. LA5 recommended to "*involve them [stakeholders] in the process from the beginning, [so] they realise they are part of the process*" . By being inclusive, it was felt that there would be less resistance to change or fear of the unknown. Stakeholders also identified the need for transparency of the process, A4 commented that "*there would always be a who would be in charge of it, what extra jobs would there be, that would be fine as long as it was made very clear, with a clear implementation strategy to make it successful*". Flexibility was also considered essential to allow for changes, renewal and adaptations of the BM. LA3 commented that "*processes like this are iterative, and they are not going to come up with a solution and it is going to be perfect … they are going to have to keep prototyping, testing and refining*". LA5 strengthened that the BM must be "*adjustable, to take the concept of what you are selling and add more to it*".

Finally, stakeholders emphasised the need to be sustainable, to overcome barriers and explore alternatives to find the best possible strategic and organisational fit. Strategically, stakeholders proposed that embedding sustainability would help achieve competitive advantage through the BM in the long term. A3 claimed that a BM would help "*limit it down to what is going to make the biggest difference, what is going to help you, which activities are going to help you deliver those chief objectives*".

4.2 The Proposed ARBM

The ARBM incorporates the five BM themes (existing resources, AR value, stakeholder benefits, AR implementation and revenue generation) and associated sub-themes from the findings presented in the previous section (see Table 1). Interplay and interaction amongst each theme was identified, and in the analysis, it was clear that each ARBM theme was interrelated, and cannot stand alone. For example, new technologies should complement, not detract from

the current offer. This represents interplay between existing resources and AR value, since existing resources must be leveraged to gain value from AR. Similarly, a connection between stakeholder benefits and AR value emerged; without additional AR value, stakeholder benefits would not be generated. For example, it would not be possible to increase job security through increased visitor numbers without providing an enhanced AR visitor experience. The interaction between revenue generation and other ARBM themes (AR value, stakeholder benefits and AR implementation) was also important, for instance, failing to consider technological infrastructure (e.g. AR implementation) could hinder revenue generation. Moreover, without the potential of revenue generation, AR implementation would not be viable. Equally, failing to consider technological infrastructure necessary to support AR implementation would hinder potential revenue generation. In another example, the identification of stakeholder benefits (e.g. increased job security and preservation of knowledge) is necessary to gain support for AR, which directly influences AR revenue generation potential. Likewise, technological readiness is a prerequisite to successful revenue generation, and SMEs cannot afford technological problems. The interplay between themes is represented by the circular dotted line in Figure 2.

The five BM principles (sustainability, inclusivity, transparency, flexibility and suitability) constitute an important anchor for our model. The principles represent the organisational culture and stakeholder values. For example, stakeholders reinforced the need to ensure AR was implemented sustainably. Thus, sustainability should be addressed in decisions made in the ARBM. Moreover, as a small organisation, transparency was considered crucial, hence, AR implementation decisions should be transparent, and any changes to daily routines, responsibilities and so on should be clearly communicated to stakeholders at all levels. Stakeholders regard the ARBM principles as crucial to increase the organisations ability to adapt and renew their BM to pursue new opportunities. This is particularly important, given the emergent nature of AR technology, and also reflects the need for SMEs to be agile in their operating environment.

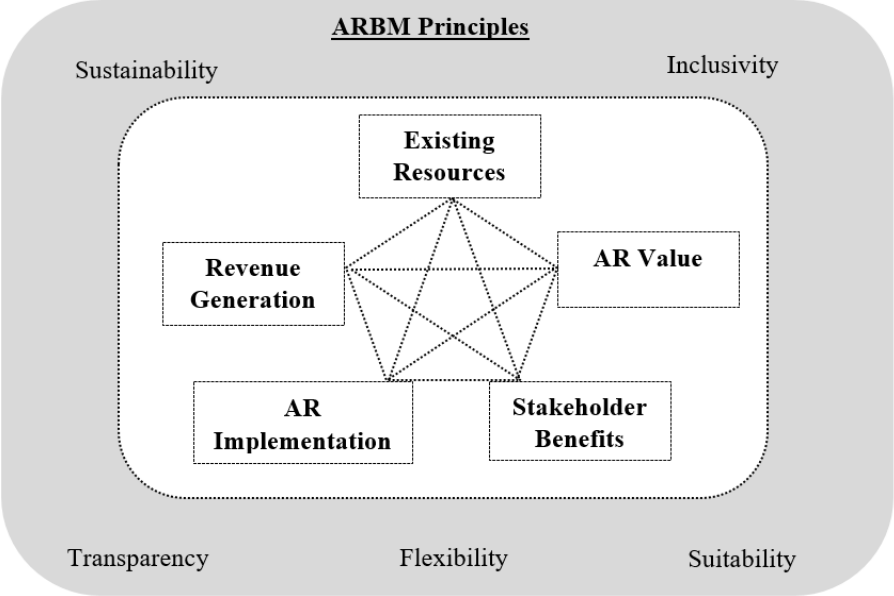

Figure 2 The ARBM

4.3 Phase 2: Validation of the ARBM

Table 2 presents AHP results which organised conflicting stakeholder views into a rationalised model, supporting the identification of a unified group judgement. This allowed us to validate the ARBM for application in the SME context, by identifying the most preferable ARBM sub-themes, in order of importance.

Heritage significance emerged as the most important sub-theme of existing resources, ranked 4.6% higher than other sub-themes. Given the particular characteristics of this UNESCO attraction, and the passion of the stakeholders for its history, this is perhaps not surprising, and points to the possibility of AR being able to strengthen and enhance this existing resource. Long-term value was revealed to be the most important AR value sub-theme, weighted considerably (6.3%) higher than education, ranking second. Hence, the most significant AR value is seen as the most long lasting, and addresses the ability for AR to preserve knowledge, and contribute to protecting and conserving the environment. Sustainability also emerged as a key business modelling principle confirming that ensuring and improving long-term sustainability are fundamental to the SME and should be addressed throughout the process. These findings are also consistent with preserving knowledge which emerged as the most important sub-theme for stakeholder benefits. Interestingly, gamification was ranked least important in terms of AR value. We believe that one reason for this is perhaps due to the visitor typology and nature of the cultural heritage attraction under investigation in that heritage is integral to the value offering. Hence, gamification could be regarded as commodifying and

commercialising the past, which would undermine and detract from the significance of the heritage and history of the attraction and local area. This reinforces the important point that when implementing new technologies, such as AR, it is essential to first understand the current value offering and therefore ensure new technologies complement and extend this.

With regards to AR implementation sub-themes, development was considered most important (20.7%), followed by maintenance (18.6%). For revenue generation sub-themes, secondary revenue was ranked most important (14.3%), closely followed by visitors bring devices (14.1%). This shows that stakeholder preference is for the costs of AR implementation to be reimbursed through the generation of secondary revenue, such as ticket sales or increased spend on site, rather than increasing the entry fee which emerged as least preferable. This is largely consistent with Phase 1 findings where many stakeholders recommended AR users should not be charged an additional fee, which we believe stems from a fear of outpricing visitors, in that, stakeholders expressed concern not all visitors would be willing to pay a higher entry fee for the AR experience and that AR should be implemented as a tool to better the offer and visitor experience as part of longer term strategic plans for the attraction.

Table 2 Inclusive hierarchy of ARBM themes and sub-themes

ARBM Component	Ranking	Importance	Weight (%)
Existing resources	1	Heritage significance	27.6
	2	Education	23.0
	3	Staff	20.3
	4	Uniqueness	20.0
	5	Range of activities	9.2
AR value	1	Long-term value	22.7
	2	Education	16.4
	3	Monetary benefits	16.3
	4	Interpretation	15.0
	5	Marketing	13.7
	6	Navigation	10.0
	7	Gamification	5.9
Stakeholder benefits	1	Preserve knowledge	26.8
	2	Secure jobs	24.5
	3	Attract investment	20.6
	4	Community pride	15.3
	5	Improve efficiency	12.8
AR implementation	1	Developing	20.7
	2	Maintaining	18.6
	3	Funding	17.7

	4	Launching	16.4
	5	Supporting	14.5
	6	Promoting	12.1
Revenue generation	1	Secondary revenue	14.3
	2	Visitors bring devices	14.1
	3	AR free	13.5
	4	Pay to hire devices	13.3
	5	Pay to use AR	12.5
	6	In-app purchasing	12.5
	7	Flexible costs	11.5
	8	Increased entry	8.4

5 Discussion and Conclusion

The aim of this study was to develop a BM to support SME visitor attractions to implement AR, using the case of a UNESCO listed visitor attraction in the UK. Addressing RQ1, Table 1 identifies key BM themes and sub-themes, which provide unique insight into the ways SMEs in the tourism context can adopt AR. Whilst previous studies already recognise that AR offers new opportunities to create enhanced experiences, improving education and interpretation (e.g. Flavián et al., 2019; Tussyadiah et al., 2018), the use of AR as a tool to preserve knowledge emerged as key finding, and was identified as a stakeholder benefit sub-theme. The potential of AR to allow visitors to experience the attraction through the eyes of people who were part of the heritage is both a significant implication, and demonstrates the importance of involving stakeholders in the BM development and innovation process. Stakeholders acknowledged the need for a clear strategy, supporting the suggestion of Nugroho et al. (2017: 332) that SME managers and stakeholders must "understand the purpose of the IT [...] the goals, aims and objectives". Findings also revealed community pride and preserving knowledge as newly identified stakeholder benefit sub-themes, confirming that, in a public sector context, AR adoption creates opportunities to create benefits for wider society. This supports recent BM literature which highlighted the need to focus beyond the internal organisation to understand impacts on wider networks and customers (Demil and Lecocq, 2015; Gutiérrez-Leefmans and Holland, 2019). Moreover, the use of AR to improve job security through increased visits was also newly identified for the SME BM context.

User acceptance of new technologies as exemplified by the technology acceptance model (Davis, 1989) is an important indicator of a successfully implemented technology. This study revealed a number of aspects specific to user acceptance in tourism, in particular the stakeholder benefits theme. Interestingly, tom Dieck and Jung (2018) identified a gap in

research exploring tourism-specific external variables which influence tourists' acceptance of AR. They found that perceived ease of use and usefulness have a positive influence on tourists' attitude to using AR in a tourist context. Similarly, discussions in the revenue generation theme regarding how tourists might use AR during the development of the ARBM also support this. Therefore, based on the implications of the ARBM, we propose that future AR and other technology-related BMs should explicitly examine the customer experience of the target technology.

SMEs in the leisure sector face a pressure to innovate through the provision of enhanced visitor experiences (Limaj and Bernroider, 2019; Valaei et al., 2017). For publicly funded SMEs, this pressure is intensified further by the need to remain economically viable (Coupland and Coupland, 2014). To validate application of the ARBM in the SME context, and address RQ2, AHP was employed to overcome conflicts arising from diverse stakeholder interests and prioritise sub-themes in order of importance. The results indicate stakeholder agreement that AR would generate secondary revenue, by increasing visitor numbers and intention to spend, which would absorb the cost of AR implementation and ongoing maintenance costs. Considering SMEs also have lower financial capabilities and abilities to raise funds (Arbussa and Marquès, 2017; Krishnamoorthi and Mathew, 2018), validation of our proposed ARBM reduces potential financial risks experienced by SMEs adopting AR. The identification of useful revenue generation sub-themes reveals opportunities for SMEs to expand their thinking in different ways and develop capabilities to generate return of investment from AR.

The implications of SMEs' inherent characteristics are not understood in relation to the BM concept (Demil and Lecoq, 2015; Rispal and Servantie, 2017). To increase the number of SMEs successfully integrating technologies (Giotopalos et al., 2017; Jones et al., 2014), RQ3 explored how the inherent characteristics of the SME under investigation may have influenced our ARBM, revealing a number of interesting results. Crucially, findings from this study go some way to detailing the BM implications of the "significant differences between SMEs and large companies" (Arbussa and Marquès, 2017: 272). First, financial sustainability was emphasised as a key principle for the BM, emphasising that AR has to prove itself as a useful innovation to be integrated into the BM. Second, the theme of existing resources emerged as an essential component of our ARBM, illustrating a need to encourage SMEs to take stock of their existing resources and consider how those resources complement new innovations rather than compete

with them. Third, the AR implementation theme indicates a need for careful consideration of role allocations, given limited resources and small staff numbers.

Organisational structure, perceived risk and technical readiness are identified as challenges inhibiting SMEs ability to adopt new technologies (Child et al., 2017; Giopoulos et al., 2017; Jones et al., 2014; Neirotti and Raguseo, 2017; Rana et al., 2019; Rispal and Servantie, 2017). This study also yielded five key principles (sustainability, inclusivity, transparency, flexibility and suitability), which represent stakeholders' values and the organisational philosophy. Within SMEs organisational culture is heavily influenced by managements' attitude, personality and values, because of the small size and flat structure (Arbussa and Marquès, 2017; Blackburn et al., 2013; Neirotti and Raguseo, 2017). Table 3 illustrates how our findings relate to the extant literature.

Table 3 Summary of theoretical integration

Components		**How the findings extend existing literature**
ARBM themes	Existing resources	- BMs unlock the value of technology (Chesbrough and Rosenbloom, 2002) - This study underlines the importance of understanding existing value in order to articulate how to add value. This study also identifies the need to consider existing resources to leverage value, as well as recognise intangible resources (e.g. humans, knowledge) - AR provides immersive experiences addressing the needs of modern visitor (Dwivedi et al., 2020; Tussyadiah et al., 2018). - We revealed five sub-themes that extend what a modern visitor might desire in the context of an AR immersive experience: uniqueness, range of activities, education, staff and heritage significance
	AR value	- AR provides many opportunities and value propositions (e.g. create personalised, enhanced experiences; Han et al., 2010; Flavián et al., 2019; Tussyadiah et al., 2018). - This study revealed seven AR value sub-themes, including: monetary benefits, improved interpretation, education, long-term value, marketing, navigation and gamification which can be seen as potential value propositions - BM literature states technologies offer opportunities to create and capture value when implemented correctly (e.g. Dubosson-Torbay et al., 2002; Shafer et al., 2005; Teece, 2010) - Our study suggests that, specifically for SMEs, AR must add to, not detract from the current offer to complement strategic objectives and therefore successfully create and capture value
	Stakeholder benefits	- SMEs' inherent characteristics are (e.g. small size and limited resources) underexplored in the BM context (Neirotti and Raguseo, 2017; Rana et al., 2019; Rispal and Servantie, 2017), thus, the number of SMEs capitalising on the potential of AR is low - The case study identified five AR stakeholder benefit sub-themes which outline specific benefits of AR for stakeholders, and therefore incentive to implement. These include stakeholder benefits, preserving knowledge, securing employment, improving efficiency, strengthening community pride and attracting investment - Specifically, from our study, AR newly emerges as a tool to: - preserve knowledge - improve community pride

		- improve job security (through increased revenue generation)
	AR implementation	- Literature claimed AR adoption has been slower than anticipated (e.g. costs, uncertainty; Tussyadiah et al., 2018). - Jung and tom Dieck (2017: 11) call for "a suitable business model for the investment and implementation of multiple technologies" - Our study progresses understanding and AR implementations by proposing an ARBM which provides insight into the ways SMEs can adopt AR - Within SMEs, resistance to change, fear of the unknown or creation of extra roles/responsibilities are often a barrier to technology adoption (Rana et al., 2019; Nugroho et al., 2017) - The case study identified six AR implementation sub-themes; support, development, promotion, maintenance, funding and launch. These can help reduce the uncertainty of AR implementation to foster greater support and minimise resistance
	Revenue generation	- AR is a disruptive technology (Rauschnabel, 2021), giving organisations an opportunity to improve their communication and marketing to extend their current offering and longevity (Dwivedi et al., 2020) - AR provides a way to ensure future success and competitive advantage of visitor attractions (Han and Jung, 2018; Obeidy et al., 2018). - The case study identified eight AR revenue generation sub-themes; generation of secondary revenue, flexible costs, in-app purchasing, increased entry, paying to use AR, AR free, visitors to bring own devices, pay to hire devices. - These are essential to help SMEs justify revenue generation options and develop capabilities to generate return of investment. They also represent important considerations for SMEs when considering AR revenue generation options to improve their competitive advantage and extend their current offer.
ARBM principles	-	- The ARBM principles present ways for SMEs to increase their longevity and AR adoption success and anchor the model - Crucially, the principles consider SMEs' inherent characteristics and related challenges to technology adoption/BM development and represent the organisational culture and stakeholder values
	Suitability	- SMEs are often hesitant to adopt new technologies because of high failure rates and perceived barriers which present too much risk without prior proof of concept. - Jung and tom Dieck (2017: 11) called for the development of "a suitable business model for the investment and implementation of multiple technologies" in the SME context. - Moreover, a number of factors inhibit SME's ability to implement technologies (e.g. limited resources, lack of knowledge; Krishnamoorthi & Mathew, 2018) - Our case reiterates that AR must be appropriate and complement the current offer to limit risk of failure
	Inclusivity	- SMEs have a flat structure/organisational culture influenced by managements' attitude and knowledge (Arbussa and Marquès, 2017; Blackburn et al., 2013) - SME managers' characteristics and understanding of technologies influences likelihood to adopt and success (Asemokha et al., 2019; Guo et al., 2016; Neirotti and Raguseo, 2017) - Our study highlights the need to be inclusive to reduce resistance/ fear of unknown, ensuring all stakeholders are made aware of changes at every stage of the process
	Transparency	- Factors inhibit SME's ability to implement technologies (e.g. organisational structure, staff resistance; Child et al., 2017; Giotopoulos et al., 2017) - It is essential "small business owners/managers understand the purpose of the IT to be adopted; the goals, aims, and objectives" (Nugroho et al., 2017: 333) - Our case study reiterates the need to ensure transparency and clear communication at all stages and levels to minimise resistance to change, and fear of the unknown, thus improving AR success
	Flexibility	- SMEs sustained success is related to their ability to adopt emerging technologies (Sunday et al., 2013). Often SMEs have heightened expectations, with high perceived risk and caution (Rana et al., 2019; Rispal and Servantie, 2017)

		- Technology implementation in SMEs often happens without proper planning causing high failure rates (Giotopalos et al., 2017; ONS, 2014) - Our study confirmed the need to be flexible to allow for renewal, change and updating - For SMEs to stay competitive and achieve sustained value creation, their BM must change over time (Asemokha et al., 2019; Westerman and Bonnet, 2014). - Our study also highlighted the importance of flexibility to different contexts / sectors
	Sustainability	- IT adoption in small businesses is low, and failure rates are high: the question is "why" (Nugroho et al. 2017: 332). There is little research on the factors, inducing SMEs to introduce "information technology" (Arbussa and Marquès, 2017: 275). - BMs are effective tools to support an organisations stability whilst navigating daily activities (Foss and Saebi, 2017) - Our study confirmed how crucial it is to enable organisations to overcome barriers and explore alternatives to find the best strategic and organisational fit - We propose sustainability will help organisations improve their competitive advantages, suitability and longevity

5.1 Theoretical Contributions

This study has a number of theoretical contributions. First, it is the first to develop a comprehensive BM for the use of a disruptive technology, such as AR, in an SME context. The study supports the widely accepted view that BMs are effective management tools to commercialise and unlock value from technical innovations (Al-Debei and Avison, 2010; Zott et al., 2010). We hope this signifies the start of a new area of practice and research to inform wider use of AR in the tourism context. In particular, our ARBM and the stakeholder approach utilised provides unique and practical insight into how AR value can be realised by proposing a number of new AR value propositions (Flavián et al., 2019). These insights can inform AR use in tourism organisations, particularly SMEs, to improve understanding of the topic area, as well as apply the BM concept in a contextually new area. This sparks wider discussions regarding innovative use of technologies in AR, and the use of BMs to inform strategy. We note that whilst our ARBM could apply to other sectors, SMEs have unique and inherent challenges (e.g. Miller et al. 2020), which we captured in the development of the model.

Second, this study suggested five key principles that anchor the model and encompass the overarching values of the stakeholders, and philosophy of the organisation when adopting new technologies. We believe these principles should be adopted for use when generating BMs with SMEs, regardless of the target technology being considered. We entirely acknowledge that the model may be subject to change depending on the specific context of use, but we suggest that the principles are enduring for all SMEs considering technological innovations, such as AR.

In the SME context, it is recognised that the better management understand technology, the more likely they will be to adopt it and therefore the higher likelihood of success (Guo et al., 2016). Similarly, SMEs that adopt an innovative mindset and align their processes to renew their BMs, often outperform those that do not (Chan et al., 2018). We suggest that our ARBM principles provide a means to holistically capture the philosophy of the organisation when developing capabilities to adopt new technologies. Stakeholders emphasised that any AR implementation would have to address all five principles, and were particularly concerned that new technology adoptions must be sustainable in terms of longevity and finically in the long term to pay for itself. Inclusivity was also stressed; stakeholders felt involvement was key to any successful implementation. This supports Sunday et al. (2013) claim that stakeholder involvement is crucial for successful technology adoption. The principles also help reduce the "disconnection between vision and execution" which Nugroho et al. (2017: 331) attribute as one of the main reasons for high failure rates of technology adoption in SMEs.

Third, the identification of new AR value propositions provide insight into the ways AR can be implemented beneficially to increase the acceptance of new technologies at SME tourist attractions. Table 2 demonstrates stakeholders saw the biggest opportunities for AR to increase long-term value and enhance the provision of education. Use of AR to increase visitor attraction longevity is newly identified for the SME BM context, and illustrates the need for SMEs to innovate their BMs by implementing technologies to increase their future sustainable competitive advantage. This offers novel perspectives adding to the existing pool of knowledge to enrich understanding of ARs potential and value. As tourist organisations face mounting pressure to adopt and invest in disruptive technologies, we hope this goes some way to providing insight into how AR can create enhanced tourist experiences, and continue attracting younger, modern visitors - the visitors of the future.

Fourth, few studies to date have explored the influence of SMEs' inherent characteristics on their ability to innovate or develop their BMs (Child et al., 2017; Demil and Lecoq, 2015; Jones et al., 2014; Miller et al., 2020). This study contributes theoretically to an increased awareness of the relevance of BMs in the SME context, advancing current understanding. Crucially, the model is the first BM specifically for the SME context. The study outlines a number of avenues for SME visitor attractions to pursue when developing capabilities to implement AR. These specifically exploit SMEs' inherent characteristics, such as greater flexibility and agility, fewer regulatory constraints and better relationships with stakeholders (Arbussa and Marquès, 2017;

Valaei et al., 2017), to capitalise on the opportunities presented to increase their competitiveness, longevity and future success.

5.2 Practical Contributions

Moreover, this study makes a number of practical contributions, bridging a gap by proposing a BM for AR in SMEs, using the case of a small visitor attraction in the UK. The ARBM provides focus for the adoption of technologies in SMEs identifying a number of opportunities to create and capture value from AR, and we suggest that this model could also be used with other new technologies, such as VR and IoT.

The identification of new AR value propositions that not only included monetary benefits, but also value in terms of interpretation, education and longevity, suggest that technology adoption cannot be seen purely in terms of tangible benefits, but intangible benefits that add value to the customer experience. This is particularly important and provides practical insight whilst acknowledging the need to create enhanced and unique AR experiences to meet the changing needs of the modern visitor (Valaei et al., 2017; Xu et al., 2017).

This study also revealed a number of AR implementation sub-themes, identifying new roles and tasks necessary for SMEs to adopt AR, which are therefore a prerequisite to AR implementation. Acknowledging SMEs' inherent challenges, such as small size, resource and funding limitations (Chen et al., 2020; Giotopoulos et al., 2017; Rana et al., 2019), it is essential, and for any SMEs the detailed resourcing of AR adoption needs to be considered up front, to avoid resources in fact becoming barriers to implementation. These findings support the widely accepted activity-systems perspective of BMs, whereby BMs are regarded as a set of activities, processes or functionalities that encourage systematic and holistic thinking (Gutiérrez-Leefmans and Holland, 2019; Zott and Amit, 2010). This also reinforces the need for SMEs to adopt a stakeholder approach and involve their wider stakeholder network.

In the course of developing the ARBM, the identification and prioritisation of sub-themes help SMEs avoid a "disconnection between vision and execution" (Nugroho et al., 2017: 331). Crucially, validation of the ARBM provides support for the adoption and acceptance of AR technology in the SME visitor economy. The findings provide important insight to help other SMEs make informed strategic decisions and practical ways to exploit the opportunities presented by AR. Moreover, the ARBM goes some way to ensure that SME tourist attractions

do not miss out on the opportunity to exploit the potential of AR, by proposing a practical and authenticated BM to capitalise on the opportunities presented by AR. In the wider sense, the ARBM outlines a number of practical ways for other tourism attractions and larger organisations to adopt AR. This helps minimise the risk associated with adopting and investing in new technologies, important for all organisation exploring new innovations, but patricianly SMEs.

The ARBM advances existing knowledge, extending BM theories by applying the BM concept to AR. The ARBM provides a tangible framework to enhance SME tourism organisations decision-making and performance when integrating AR. Carefully, examination of the complex and interrelated nature of both tourism and AR, and use of AHP to combine diverse stakeholder perspectives into one group decision hierarchy, provides strong proof of concept. Hence, the ARBM is a comprehensive and fluid template for management outlining a practical approach to implement AR, which can be updated and adapted as necessary and used to mobilise further thinking and adaptation to new technological developments.

5.3 Limitations and future research

The study has some limitations, for example, the findings are conceptual and whist they have depth and breadth, especially around AR value, the true impact of the ARBM cannot be determined until AR is fully adopted by the visitor attraction. That said, the ABRM was validated by the stakeholders themselves which would increase the chance of successful adoption. In addition, this study looked at the specific tourism context and therefore findings are not immediately generalisable to SME businesses in general, but we believe there are key analytic generalisations that do apply to other SME contexts. For instance, the key principles of the ABRM are relevant not just for AR adoption, but other innovative technologies being considered by SMEs. Further research should therefore be conducted and validated in other SME domains, and with other technologies. Whilst the ARBM makes a unique contribution proposing a BM for the adoption of AR in the SME context, some comparisons can be drawn between the ARBM and existing V4 BM (Al-Debei and Avison, 2010). Both models outline specific principles that should be addressed to support BM innovation and inform future SME BM development. There are also some similarities to the Business Model Canvas (BMC) (Osterwalder et al., 2010), for example, the identification of staff and technologies as value adding resources. Whilst we acknowledge the similarity of our model to BMC, it is important to note that the BMC is not without its critics. This strengthens the need for future BMs to

provide practical principles to support BM adoption. Given the unique characteristics of SMEs, we consider these practical principles an important contribution of our model. We suggest that these principles can and should be used to inform future SME BM development, regardless of the target technology.

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8 Appendices

Appendix A. Stakeholder Profile

Code	Organisation	Position
A1	Visitor Attraction	Trustee
A2	Visitor Attraction	Chair of Trustees
A3	Visitor Attraction	Marketing Officer
A4	Visitor Attraction	Learning Officer
A5	Visitor Attraction	Development Officer
A6	Visitor Attraction	Guide
A7	Visitor Attraction	Curator
A8	Visitor Attraction	IT Manager
A9	Visitor Attraction	Mine Manager
LA1	Cornwall Council	Cultural Programme Officer
LA2	Visit Cornwall	Chief Executive Officer
LA3	Cornwall Museum Partnership	Chief Executive Officer
LA4	Cornwall Museum Partnership	Development Officer
LA5	(Freelance)	Museum Marketing Expert
LA6	Cornwall National Trust	General Manager
T1	University of Falmouth	University Lecturer

T2	University of Falmouth	University Professor
T3	St Ives Secondary School	Secondary school teacher
LB1	Visitor Attraction Café	Assistant Manager
LB2	Visitor Attraction Shop	General Manager

Appendix B. Visitor Profile

Code	Gender	Age Group	Visiting from…
V1	F	18–24	USA
V2	M	18–24	USA
V3	M	45–54	USA
V4	F	45–54	USA
V5	F	18–24	UK
V6	F	45–54	UK
V7	F	25–34	UK
V8	M	35–44	UK
V9	F	45–54	UK
V10	M	35–44	UK
V11	F	55–64	UK
V12	F	55–64	France
V13	M	35–44	UK
V14	F	35–44	UK
V15	M	45–54	Netherlands
V16	F	45–54	Netherlands
V17	F	55–64	UK
V18	F	18–24	UK
V19	F	35–44	UK
V20	F	35–44	Canada
V21	M	45–54	Canada
V22	F	45–54	UK
V23	F	45–54	UK
V24	M	45–54	UK
V25	F	45–54	UK

V26	M	45–54	UK
V27	F	25–34	UK
V28	M	45–54	UK
V29	M	55–64	UK
V30	F	55–64	UK

Appendix C. Example Interview scripts

Interview Questions (2): Internal Stakeholders	
1	What is your current understanding of AR?
2	Based on what I showed you (AR demo), has your understanding of AR changed?
3	What is your role at [insert name of organisation]?
4	How long have you worked at [insert name of organisation]?
5	What are your responsibilities at [insert name of organisation]?
6	Who are your main business partners?
7	Why do you think people visit [insert name of organisation] and what value does it offer?
8	Who are the main target markets?
9	To what extent do you think AR can add value to [insert name of organisation]?
10	In your opinion, what is the main strength of [insert name of organisation]?
11	Could anything be improved upon, if so how?
12	To what extent do you think implementing AR could help improve [insert name of organisation] from your point of view as a member of staff?
13	In what ways do you think implementing AR could help improve [insert name of organisation] from the point of view of the visitor?
14	How do you/to what extent do you think AR could be used to make a difference?
15	In what ways do you think developing an AR application could help increase income?
16	In your opinion, could implementing AR at [insert name of organisation] be beneficial?
17	Do you see any potential problems with implementing AR at [insert name of organisation]?

Interview Questions (3): Tourist Bodies	
1	What is your relationship to/with [insert name of organising]?
2	Why do you believe people visit [insert name of organising]? *e.g. day out, something to do, interest in mining, heritage, machinery etc.*
3	What is the value of [insert name of organising]? *e.g. preservation of history, cultural and heritage offering*
4	What value do you believe it offers to visitors? *e.g. education, entertainment, special interest*
5	To what extent do you believe an AR could add value? Why? How? *e.g. entertainment, enhance knowledge, fun, exciting*
6	How do you think AR could improve [insert name of organising]? *e.g. modernise site, bring things to life, make more interactive*
7	In what way do you see an AR having a beneficial impact to [insert name of organising]?
8	In what ways do you think introducing AR at [insert name of organising] would be of benefit to you/the organisation?
9	In what ways do you think AR could help increase income and profits? How? *e.g. sell app as an add-on, link to café and shop*