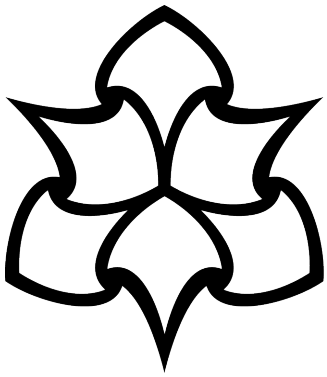

Exploring the value of augmented reality for tourism

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ABSTRACT

Augmented reality (AR) is increasingly used as a marketing, information and experience channel within the tourism industry. However, little is known with regards to the actual value of AR for the tourism industry, with most research still in its infancy. Therefore, the aim of this paper is to explore the perceived value of AR for the tourism industry from the perspective of tourism experts. Using a qualitative and exploratory approach, this study conducted fifteen interviews with tourism experts in order to explore tourism specific AR value dimensions. Interviews were analysed using thematic analysis. This study revealed five value dimensions including marketing, economic, tourist, epistemic and organisational. Commonalities and differences between different perspectives are discussed. These findings provide important implications for strategy development, AR implementation, and tourist experience design.

1. Introduction

Augmented reality (AR) enhances the real-world environment, providing context-sensitive information of the users immediate surroundings by overlaying computer-generated content (e.g. avatars, 3D models, interactive features) onto their direct view through a device (e.g. Han, Jung, & Gibson, 2014; tom Dieck & Jung, 2017; Yung & Khoo-Lattimore, 2017). AR popularity has increased rapidly, gaining increased industry and academic attention over the past 5 years, and nowadays AR is considered to be "one of the most revolutionary inventions in recent years" (He, Wu, & Li, 2018, p.127). One reason for this popularity, is an increased awareness of its unique ability to provide a mediated perception of the real-world environment by seamlessly integrating it with computer-generated content (Han et al., 2019). In acknowledgment of its benefits, there have been an increasing number of studies exploring the value presented by AR in the tourism sector. Such studies report AR can improve education and interpretation (tom Dieck & Jung, 2017), tailor information to tourists' specific preferences (Kounavis, Kasimati, & Zamani, 2012), increase interactivity (tom Dieck, Jung, & Han, 2016) and improve entertainment and engagement (Xu, Buhalis, & Weber, 2017).

AR creates enhanced user experiences, and is widely recognised as an effective tool to enhance interaction with, and perception of the real world environment (Tussyadiah, Jung, & tom Dieck, 2018). The introduction of Pokémon Go in the Summer of 2016 was considered the first mainstream AR application game and catalyst for increased interest in AR from the general public (Rauschnabel, Rossmann, & tom Dieck, 2017). Within the tourism industry AR offers many opportunities to add value, providing tourists with a new and innovative way to explore unknown surroundings (Cranmer, tom Dieck, & Jung, 2018), and use of technology has reached the point it has become fully integrated into our daily lives (Wang, Xiang, & Fesenmaier, 2016). This has had a significant impact on many industries, particularly tourism, changing travel behaviours, decision-making and information searching (Wang, Love, Kim, & Wang, 2014). The unique characteristics of mobile technologies, for example ubiquity, flexibility, personalisation and dissemination make it a useful tool for both tourism suppliers and consumers (Kim, Park, & Morrison, 2008). Thus, the number of tourism organisations exploring the potential application of technologies to enhance tourist experiences has risen (Neuhofer, Buhalis, & Ladkin, 2014; Tussyadiah, 2014). For instance, Kuoni Travel teamed up with AR providers Aurasma to engage potential tourists' attention and increase sales by developing AR advertising and magazine content promoting their services, products and offers (Hassan, Ekiz, Dadwal, 2018). In another example, Thomson Cruises introduced an AR brochure as a unique way to showcase their cruise ships to potential tourists' (Hassan et al., 2018). Such AR applications support an increased need that "tourists are now seeking more personal, unique and memorable experiences, which require deeper engagement and a multisensory stimulation" (Xu et al., 2017, p. 247). Consequently, the adoption and exploration of ARs potential in tourism sectors has been described by Hassan and Rahimi (2016) as crucial to ensure business-

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profitability, a s w ell a s b etter p roducts a nd s ervices. T herefore, considering that AR requires high investments, it is essential to explore its full potential prior to making any implementation decisions (tom Dieck & Jung, 2017).

As such, studying the perceived value of technology has proven to provide important implications towards the usefulness of new information communication technologies (ICT) (Jiang & Kim, 2015). The importance of, for instance, economic, educational or social value has been explored within various contexts (Chiabai, Paskaleva, & Lombardi, 2013; Jiang & Kim, 2015). Previous research has also examined the perceived value of AR within the cultural heritage context (Cranmer et al., 2018; tom Dieck & Jung, 2017). However, studies on perceived AR value dimensions within the tourism context are limited. According to tom Dieck and Jung (2017) it is imperative to explore the value of AR in order to ensure successful future adoption. Literature has long discussed the link between value creation, long-term profitability and business success which furthermore strengthens the need to explore the value of a new and innovative technologies such as AR (Peppard & Ward, 2016). Therefore, the aim of this study is to qualitatively explore tourism-specific AR value dimensions with a focus on tourism suppliers.

2. Literature review

2.1. Augmented reality

AR technology has three distinctive characteristics; it combines real and virtual, is interactive and in real time and registers in 3D (Azuma, 1997). AR can both add, or remove physical objects from view and replace it with alternative content (Azuma, 1997). Thus, AR has the potential to create an augmented perception of reality, enhancing what the users see in the real world, or create an entirely artificial environment showing users what does not exist in the real world (Kipper & Rampolla, 2012). By seamlessly blending computer simulations in real environments, AR creates an enhanced view supplementing the users' environment with digital content, thus facilitating integration between physical and virtual worlds (Flavián, Ibáñez-Sánchez, & Orús, 2019). AR has numerous advantages over other media, such as video and audio, through its ability to combine “a live view in real-time with virtual computer-generated images, creating real-time augmented experiences of reality” (Kleef, Noltes, & Spoel, 2010, p.1). 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.

AR devices can be stationary (e.g. interactive displays in museums), mobile based, or wearable (e.g. AR Smart glasses) (Rauschnabel, Felix, & Hinsch, 2019). Google Glass was one of the first AR Smart Glasses trialled in the tourism context, facilitating hands-free unobtrusive and enhanced experiences (Han, tom Dieck, & Jung, 2019). However, despite initial traction, because of limitations such as uncomfortable and bulky hardware, Google Glass development stopped (tom Dieck et al., 2016). Therefore, more recent use cases explore the opportunities of intuitive devices such as Microsoft Hololens (Hammady & Ma, 2019). Microsoft Hololens are classified as Augmented Reality Smart Glasses (ARSG) because they integrate virtual information into user's direct field of vision through a glass-like device (Kalantari & Rauschnabel, 2018). Having a realistic integration of 3D information blended into the real environment, users are able to interact with the device through hand gestures, gaze and voice commands. Mobile AR enables users to interact with virtual content, using the same interactions they would with a tangible object (Kipper & Rampolla, 2012), thus encouraging different interactions and revolutionising access to information allowing the world to become the user-interface (Hammady & Ma, 2019).

Whilst AR can be experienced through a range of devices and advanced wearable devices seamlessly integrate digital content into the real world, the smartphone remains the most common AR device due to high proliferation and accessibility (Wang et al., 2016). The recent success and understanding of AR can be linked to wider use of smartphones and development of a range of applications (Han et al., 2019; Jung & tom Dieck, 2017). Smartphones are minimally intrusive, socially acceptable, easy to use and widely available (Biseria & Rao, 2016). Furthermore, technological advances in smartphone cameras, gyroscopes, solid state compasses, accelerometers, improved processing and graphics, touch screen and embedded sensors facilitate new opportunities to create enhanced AR experiences (Billinghurst & Duenser, 2012). For example, the improved accuracy of geolocation and precise location determination using smartphone camera viewfinders allow AR applications to provide users with context-sensitive information on their immediate surroundings (Yovcheva, Buhalis, & Gatzidis, 2013). Using the device camera, AR images, videos or audio are superimposed on their view of the real-world, in real-time (Biseria & Rao, 2016). In a tourism context, smartphones have been identified as the preferred AR platform, due to ease of implementation, low costs, reliability and ability to run powerful AR applications (Chung, Han, & Joun, 2015).

2.2. Augmented reality in tourism

The introduction and increased proliferation of technologies has had a significant impact on many industries, especially the tourism sector (Ukpabi & Karjaluoto, 2016). Technological advancements, such as AR, have impacted and disrupted all tourism organisations (Sigala, 2018). The increased awareness and use of these technologies, have changed travel behaviours by revolutionising the way in which tourists search for information, make decisions (Wang et al., 2014), purchase tourism products and services, find and explore reviews (Ukpabi & Karjaluoto, 2016). As the use of technologies in tourism has increased, the distinction between tourist experiences and daily life has become increasingly blurred. This blending has been defined as spill-overs (Wang et al., 2016), and much research explores the impact of AR spill-overs upon travel experiences (Cranmer, Jung, tom Dieck & Miller, 2016; Han et al., 2019). For instance, Cranmer et al. (2016) took an internal stakeholder perspective to examine the use of AR within the cultural heritage tourism context. With regards to the visitor experience, their study revealed AR adds value, by modernising the existing offering. This in turn is expected to make it more attractive for new markets, as well as, retain existing ones. Further, Han et al. (2019) explored how meaningful tourism applications can be developed by including tourists as part of the development and implementation stage.

In a study of American tourists' travel behaviours, Wang et al. (2016) observed that tourists' smartphone use during travel experiences have become a big part of their daily routine and interaction. It was proposed that the ubiquity of technologies has created a culture whereby tourists rely more predominantly on technologies to maintain their social lives, complete work and study, thus influencing other behaviours in their day to day lives (Sigala, 2018). He et al. (2018, p. 129) reported “adopting AR in the tourism context can enhance consumers experiences, improve their attitude, and increase positive behavioural intention”. AR empowers tourists' to explore unfamiliar surroundings, offering interesting and valuable information to enhance their experience (Han et al., 2014). The provision and addition of information in different formats has been found to help capture and retain tourists' attention (Kounavis et al., 2012). In particular, this presents opportunities for museums to modernise their offer, providing more engaging and interactive content (He et al., 2018; Scarles, Casey, & Treharne, 2016), and AR has been reported to help create more memorable, engaging, immersive and educational tourist experiences (tom Dieck, Jung, & Rauschnabel, 2018; Tussyadiah et al., 2018). Specifically in the cultural heritage tourism context, AR has been found to provide an enhanced tourist experience, as well as create business benefits, such as secure additional sources of revenue and decrease seasonality (Cranmer et al., 2016). Hence, for tourism suppliers to remain competitive and attractive to modern tourists and address spill-overs, they must explore the value presented by AR.

AR's main potential is seen at the pre-booking, information gathering stage, as well as the enhancement of the on-site experience. In terms of the booking process, AR has been reported to help upsell accommodation, travel and tourism attractions (Gerrity, 2018). Compared to traditional media such as brochures and videos, AR creates emotional interaction due to the immediate connection established between the company and tourists (Olsson, Lagerstam, Kärkkäinen, & Väänänen-Vainio-Mattila, 2013). For example Marriott developed an AR application to showcase some of their most exclusive resorts, allowing consumers to explore "places that they either might not have previously considered, or ones they've always been interested in seeing" (Taylor, 2018, Online).

Research has proven that AR can create richer, more immersive experiences, improving engagement (Jung, Chung, & Leue, 2015), increasing visitor numbers (Cranmer et al., 2018), and creating more personal products (Kounavis et al., 2012). Previous studies have explored the value of AR for tourism from a range of perspectives, for instance; cross-cultural (Jung, Lee, Chung, & tom Dieck, 2018), stakeholder (tom Dieck & Jung, 2017), the creation of unique experiences (Tussyadiah et al., 2018), organisational (Cranmer et al., 2016), visitor (tom Dieck et al., 2016) and business model (Cranmer et al., 2018). Such studies illustrate AR adoption in tourism can create enhanced experiences, improve tourists attitudes and behavioural intentions (He et al., 2018). Moreover, adopting AR is considered crucial to ensure business-profitability, innovation and to better existing products and services (Hassan & Rahimi, 2016). However, studies exploring the value of AR with a specific focus on the perspective of tourism suppliers are scarce.

2.3. Perceived value

The concept of value has progressed from the traditional perspective that organisations create and provide value to customers (Kohli & Grover, 2008), towards the co-creation of value whereby organisations and customers play an equal role in the creation of value (Prahalad & Ramaswamy, 2013). This progression mirrors changes in behaviour and expectations, driven by the increased proliferation of technologies. For several years, researchers have explored the role played by ICTs in value co-creation (Kohli & Grover, 2008). ICT has supported the combination of competencies, capabilities and knowledge that underpin effective value co-creation (Srivastava & Gnyawali, 2011). Value co-creation is centred upon Service-Dominant Logic (S-D Logic) that permits it is the joint responsibility of organisations and customers to co-create value, which by extension includes the entire stakeholder network (Shaw, Bailey, & Williams, 2011). tom Dieck and Jung (2017) also strengthened the need to involve multiple stakeholders prior to investment and implementation of new technologies.

In line with S-D Logic, value co-creation is defined as the "joint creation of value by the company and the customer" (Prahalad & Ramaswamy, 2004, p. 8). Value co-creation has gained increased attention with a rise in customers looking for opportunities to create value for both themselves and organisations (Zine, Kalkarni, Chawla, & Ray, 2014). However, the realisation of value depends on consumers participating in the process (Cabiddu, Lui, & Piccoli, 2013). Hence, it is acknowledged as crucial that consumers have an active and significant role in the innovation processes of new products or services to ensure value is added from their perspective (Kristensson, Matthing, & Johansson, 2008; Zine et al., 2014). Prahalad and Ramaswamy (2013, p. 33) supported that value is added "where individuals exercise choice". In a tourism context, researchers agreed it was important consumers take part in the process of value co-creation to create richer and more memorable experiences (e.g. Jung & tom Dieck, 2017; Neuhofer, Buhalis, & Ladkin, 2012; Prebensen, 2013). The participation of consumers in the value creation process has also been found to create sustainable competitive advantages (Payne, Storbacka, & Frow, 2008), as well as increase acceptance and intention to use new technologies (Kristensson et al., 2008).

The co-creation of tailored, personal and meaningful experiences is regarded key to the creation of value (Boswijk, Thujssen, & Peelen, 2007). In a study of value co-creation in a tourism context, Jung and tom Dieck (2017) found the integration of technologies contributes to the co-creation of value for organisations, as well as, pre-visit, on-site and post-visit tourist experiences. They suggested the implementation of technologies such as AR, can enhance intention to visit (pre-visit), provide richer information and interpretation, learning and enjoyment (on-site), and increased spending and intention to revisit (post-visit), overall enhancing the tourist experience. But, confirmed further research is required to explore consumers' perceived value with innovative technologies such as AR (tom Dieck & Jung, 2017).

Delivering value affects customer satisfaction, loyalty and consequently business success. Therefore, value creation is considered immensely important for profitable business operations (McDougall & Levesque, 2000). Nevertheless, perceived value is subjective to each individual case and thus needs to be evaluated on a case by case basis as organisations may have different opinions with regards to perceived value (Eggert & Ulaga, 2002). Different studies have found variations in perceived value dimensions such as economic, environmental, emotional, functional, social and epistemic within the hotel context (Jiang & Kim, 2015). The importance of perceived value was also addressed within the cultural heritage tourism context by Chiabai et al. (2013) who used a stakeholder approach to explore how technologies can be used to enhance the visitor experience. Their findings revealed six categories of perceived value including; environmental, emotional, historical, cultural, tourist and social. Nevertheless, research on AR Value within the tourism context is scarce.

According to tom Dieck and Jung (2017) economic value relates to costs and whether products and services are worth investment. Jiang and Kim (2015) refer to functional value, derived from an individual's perceptions of perceived quality and expectations from price, for example quality often has a positive influence on price, increasing willingness to pay a premium. A number of studies support that increased access to information increases perception of value for money (e.g. tom Dieck & Jung, 2017). Similarly, Jiang and Kim (2015) suggested emotional value are the feelings or affective states generated by a product or service, which are often influenced by perception of value for money and quality.

Increasingly organisations are implementing new technologies to appeal to and create epistemic value, which is linked to an individuals' curiosity about new products and services, and willingness to experience something new or satisfy a desire for knowledge (Jiang & Kim, 2015; tom Dieck & Jung, 2017). Similarly, social value refers to an individuals' personal fulfilment of product or service use, or whether an individual perceives that their actions will be recognised by others (Jiang & Kim, 2015). Environmental value concerns attitudes and behaviours towards the environment (Jiang & Kim, 2015).

It is widely accepted that technologies can enhance cultural value, through the provision of additional information (tom Dieck & Jung, 2017). Similarly, technologies have been reported to increase historic value, increasing interest in, and appreciation of history (Chiabai et al., 2013). Moreover, Chiabai et al. (2013) reported technologies create tourist value, improving the tourist offer through the promotion of diverse activities, and recommendations of products and services based on tourist feedback. Experimental value refers to an individuals' perception of products and services, through direct use or indirect observation (tom Dieck & Jung, 2017). Finally, technologies have been reported to enhance the educational experience, through the personalisation of information for all age groups (tom Dieck & Jung, 2017). Table 1 presents a summary of previously identified value dimensions in the tourism context, a description of each and indication of which authors previously identified each value dimension.

Table 1
Value Dimensions in Tourism Context.

Perceived value dimensions	Description	Chiabai et al. (2013)	tom Dieck and Jung (2017)	Jiang and Kim (2015)
Economic	Related to costs and whether products and services are worth investment	X	X	
Environmental	Value related to attitudes and behaviours towards the environment	X		X
Emotional	Value related to feelings or affective states generated by a product or service	X		X
Functional	Value from perceptions of perceived quality and expectations from price			X
Social	Fulfilment from product or service use, or perceptions of whether actions will be recognised by others	X	X	X
Epistemic	Value related to curiosity or willingness to experience something new to satisfy a desire for knowledge		X	X
Cultural	Enhanced value provided through access to additional information	X		X
Historical	Increased interest in, and appreciation of historical value	X		
Tourist	Improved tourist offer through the more diverse activities and recommendation based on tourists' reviews	X		
Experiential	Value related to direct use or indirect observation of products and services			X
Educational	Enhanced value through personalisation of information			X

3. Methods

3.1. Sample and data collection

Semi-structured interviews were used to gather qualitative data. Ten interview questions (see Appendix A) were developed according to previously reviewed literature to collect detailed insights from tourism stakeholders and managers (see Table 2). Questions were designed to allow respondents to express their opinions on the current situation and the influence of AR value dimensions on the tourism industry. Interview questions can be found in the Appendix. Interview questions were designed to understand stakeholders' perceptions, thoughts, values, feelings and perspectives (Hammond & Wellington, 2012). Interviews were conducted with 15 managers from different tourism divisions: online travel agents (OTAs) (6), traditional tour operators (TTO) (3), hoteliers (HO) (3), and online review agents (ORA) (3). Elo et al. (2014, p.4) recommended a sample must be "appropriate and comprise participants who best represent or have knowledge of the research topic". Neuman (2005) proposed as little as one representative from each body is adequate, if the respondents are particularly informative and insightful. Hence, using this sample, the aim was to collect different perspectives from a wide range of tour operators and online review agents, as well as, hoteliers to identify AR dimensions that influence the tourism industry. Face-to-face interviews were conducted and audio-recorded at ITB Berlin from the 8th to the 12th of March 2017. To ensure a greater understanding of the subject area, only participants with at least 5 years of tourism business experience were interviewed. Therefore, to select participants, a non-probability, purposeful, judgmental sampling was employed (Buhalis & Zoge, 2007). The interviews were selected using convenience sampling due to the purpose of the research, which aimed to interview tourism professionals who had more than 5 years' experience in order to adequately answer the questions and fully understand the value of new technology for the tourism sector. The interviews lasted between 15 and 20 min. Respondents held positions with some of the leading tourism companies including; TripAdvisor, Expedia, Hotel Beds, Love Holiday and Traveltek.

3.2. Data analysis

The interviews were analysed using thematic analysis. Prayag and Ryan (2011) identified thematic analysis requires researchers to thoroughly review the literature, and collect relevant data for different codes. Thus, thematic analysis enables researchers to form themes prior to analysis, allowing sub-themes to emerge during data analysis (Boyatzis, 1998). In this study, the researchers developed codes based on themes identified in pervious literature (see Table 1). As suggested by Kumar (2011), to ensure validity and reliability, interviews were conducted by one of the authors to maintain consistency. Moreover, data analysis was conducted by two researchers who both identified and agreed on the same newly identified themes. In qualitative studies, validity refers to the logic by which the research aim is justified (Babbie, 1990), and is often determined by four criteria; credibility, transferability, dependability and conformability. These are considered to represent the goodness and authenticity of results (Guba & Lincoln, 1994). Reliability examines whether researchers would get the same results if they were to replicate the study, in qualitative research this concerns the consistency, stability and honesty of results, which are reflected in robust, well designed research instruments, interviewing, transcribing and analysis of findings (Kumar, 2011). Thus, reliability of qualitative research can be achieved by consistent and well-thought through research instrument design and methodological rigour (Kumar, 2011). To ensure reliability and methodological rigour of results in this study, two of the researchers' analysed the interview transcripts to identify existing themes and sub-themes as well as generate emerging themes (Prayag & Ryan, 2011). The analysis revealed two new emerging themes; marketing and organisational value. The five value themes identified propose a perceived value dimensions specifically for the AR tourism supplier context.

Table 2
Characteristics of Respondents.

Initial	Gender	Age	Role	Initial	Gender	Age	Role
HO1	Male	43	Director of Sales	ORA3	Female	47	Sales Manager
HO2	Male	42	Sales Executive	OTA1	Male	34	Digital Marketing Manager
HO3	Male	41	Web Manager	OTA2	Male	27	Sales Manager
TTO1	Female	36	Commercial Manager	OTA3	Male	28	Account Manager
TTO2	Female	43	Regional Manager	OTA4	Male	52	Contracts Director
TTO3	Male	39	Product Manager	OTA5	Male	28	Sales Manager
ORA1	Male	26	Account Manager	OTA6	Male	32	Marketing Manager
ORA2	Male	42	Sales Director				

4. Findings

Previous studies identified a number of value dimensions within the tourism context (See Table 1). The exploratory interviews within this study revealed five AR tourism-specific value dimensions including marketing, organisational, economic, tourist and epistemic. Within the findings section, the researchers refer to interviewees as TTO, HO, OTA or ORA as shown in Table 2.

4.1. Marketing value

All interviewees found that value relating to marketing and sales activities is the most prominent benefit of implementing AR within the tourism industry. tom Dieck and Jung (2017) identified the costs of AR applications can be substantial within the tourism industry and therefore, value needs to be achieved in order to justify costs and see a return of investment. This was confirmed by OTA2, who revealed 'every company has a limited budget that can be spent for marketing and it makes sense to invest if AR helps the travel agencies to sell holiday packages better'. In addition, HO1 confirmed that AR has great marketing potential as it can provide 'better and more accurate information about our products'. Many interviewees identified the potential of AR to better promote facilities, amenities, tours and destinations. For instance, ORA1 commented that AR could improve emotive marketing potential facilitating more of a 'human touch' in comparison to traditional marketing methods. It was considered this would be particularly beneficial, since many participants pointed out the difficulty in 'selling' intangible products and experiences. ORA1 identified using AR as a marketing tool could be the difference between a potential tourist booking your hotel in comparison to five similar hotels, because 'AR can give you a taste of one hotel and one experience'. OTA4 added using AR 'we can sell a dream of the destination and the hotel to the customer rather than showing only pictures in a website or brochure' as a marketing tool to improve their understanding of what the destination is really like. This was confirmed by TTO3 who discussed the competitiveness of the industry noting tourist suppliers 'not only provide holidays in different destination, but they also provide life experiences that can be improved using AR' marketing destinations more effectively by appealing to tourists' emotional needs.

4.2. Organisational value

Participants found that AR can also have organisational value, as it represents a good communication channel and presents opportunities to improve organisational processes, functions and relationships. TTO3 commented 'I think that AR can help different departments to communicate better. For example, sales departments can communicate with other departments in order to offer the right products and services'. A similar statement was made by HO1 noting 'it [AR] can be used to improve relationships and communications because it can give more accurate information for the destination, hotels, and the facilities and it is good way to promote the facilities that the destination provide'. It was also suggested AR could help tourist suppliers form better relationships with new and existing customers, through improving the customer experience (ORA3, OTA6, HO1, HO2). In a similar way, OTA6 thought AR would offer customers more security by the fact AR can allow them to 'see what they are booking', and therefore set realistic expectations. The implementation of AR to differentiate and increase competitive advantage was also noted by a number of participants (ORA1, TTO1, OTA5, OTA6). For instance, ORA3 stated AR 'could help businesses to differentiate their offer', OTA1 added you would have better content that the competition and OTA4 added AR would be a unique selling point, whilst adding value for the customer.

4.3. Economic value

According to Jiang and Kim (2015) economic value is mainly concerned with the costs involved in new innovations and whether innovations are worth investing in. A number of participants confirmed that AR can help to achieve economic value. For instance, TTO1 and OTA2 both confirmed that these new and innovative applications can help to increase income by providing tourists with a more realistic view of products and services. In addition, TTO1, OTA4 and OTA5 thought AR can create a competitive advantage. According to OTA5, 'AR is like any new technology. The first company that uses AR will get a competitive advantage'. ORA3 confirmed AR would help to differentiate from competitors, TT3 added it would allow you to create better, more exciting and engaging content and OTA4 identified AR as a unique selling point. Upselling through AR is another economic value explored by HO1 and OTA6 who confirmed that the use of AR could help to increase sales. It was also suggested AR could help tourist suppliers sell more expensive holiday options by giving potential tourists an authentic insight through the ability to 'see' destinations. In a similar way, OTA2 added AR would increase sales, helping 'convert the traveller to purchase' using AR to visualise the intangible.

4.4. Tourist value

Interviewees recognised a number of ways AR was valuable to tourists. According to TTO3 'tourists can benefit because they can get a better feel of the destination and before going there will have all the information on what activities to do […] without having wrong expectations'. OTA6 confirmed that through the use of AR, tourists are fully aware of what to expect, consequently decreasing disappointments and complaints which can be costly for tour operators and tourism suppliers. This opinion was shared by a number of participants (OTA4, TTO3, ORA1, ORA2). Overall, participants found that the number one tourist value is the provision of enhanced information (OTA1, HO3, HO3, ORA2). Nevertheless, ORA1 raised some questions regarding the use of AR to create tourist value: 'with too much digital reality you can lose the features of the real world and what is actually happening around you… you may get a disturbed image of what you can expect'. OTA6 considered using AR to search and retrieve information would be 'much faster and easier for the consumer'. In a similar way, HO1 thought AR would help tourist decision-making because of greater accessibility to information and an increased appreciation of the intangible, enabling tourists to make better, more suitable decisions 'because they will have more data and information…[that is]…more accurate and real and trustworthy'. In this way, it was suggested AR can increase tourists' understanding and appreciation of their surroundings which could support bookings and decision-making, such as room sizes, hotel location and orientation (HO2, OTA4, TTO3, ORA2). OTA4 identified the benefit of AR to minimise potential fear of the unknown such as uncertainty because of the 'safety of a destination and cultural differences'. In the same way, AR facilitates increased accessibility to information (HO3).

4.5. Epistemic value

Sánchez-Fernández and Iniesta-Bonillo (2007, p. 427) revealed that 'epistemic value is concerned with a desire for knowledge, whether this be motivated by intellectual curiosity or the seeking of novelty'. According to OTA6, AR and virtual reality are new and interesting applications that attract tourists due to their novelty factor. Consequently, tourism suppliers are still able to benefit from AR simply by using it to market their products and services. Similarly, OTA5 confirmed that AR could still be considered a unique selling point. Finally, TTO1 found that AR provides the 'opportunity to take a virtual tour of the whole property [and] clients will be familiarised with the destination and they will have a better knowledge' which relates to the desire for new

knowledge. ORA2 added that 'we are progressing in the internet era' suggesting consumers want to be sure of what they are booking and increasingly expect access to epistemic information. With regards to the desire for information, OTA4 suggested AR would add value by 'giving the people the sense of reality in their own homes' continuing that this could 'motivate them to travel abroad'. In this way, HO1 thought AR would increase the opportunity to persuade them to purchase through fulfilling t heir d esire f or k nowledge. T o f ulfil to urists' de sire for knowledge, HO1 exclaimed AR could add value to information provision at attractions, such as museums, increasing the experience. OTA2 noted the need to adopt new innovate technologies like AR, in response to increased smartphone ownership and technology use during travel experiences. Especially commenting on the need to engage younger generations who 'use and trust online travel agencies…and book holidays through their smart phone devices' (OTA2).

5. Discussion and conclusion

5.1. Discussion

The aim of this study was to qualitatively explore tourism-specific AR value dimensions. In total, this study revealed that AR's potential for the tourism industry lies in its marketing, epistemic, economic, tourist and organisational value. In particular, this study found that today's tourism industry sees one of the strongest value factors of AR in its marketing potential. Marketing value emerged as a newly identified AR value dimension. It was of common agreement among all stakeholder groups that AR would enhance their marketing efforts, r educe marketing costs and provide richer, more accurate and engaging information. Stakeholders' awareness of the need to embed technologies into their marketing materials mirrors a heightened interest in research towards the spill-overs of increased technology use in travel decision-making and information searching (Sigala, 2018; Ukpabi & Karjaluoto, 2016; Wang et al., 2016). AR was perceived by stakeholders, in particular online travel agents, as a tool to create more valuable and emotive marketing material to sell tourist experiences. Literature supported that AR creates deeper, more personal, unique and memorable experiences, providing multi-sensory stimulations (Hassan et al., 2018; Xu et al., 2017). Similarly, Mobile AR has been found to encourage different interactions with content, allowing the world to become the user interface (Kipper & Rampolla, 2012; Olsson et al., 2013). Whilst other industries have examined the opportunities presented by AR marketing, there is a need to further explore this potential within the tourism context.

ARs organisational value emerged as a second newly identified value dimension. The tourism industry recognised potential for AR to add value to organisations by helping develop stronger relationships, improve functions, processes and enhance communications. Whilst all stakeholders agreed AR would offer o rganisational b enefits, online travel agencies were particularly interested in ARs organisational value to improve communication, processes, and functions and strengthen relationships, as well as foster and build stronger relationships with suppliers. Although Sigala (2018) noted the value offered b y technologies to assist in the completion of work, research has not previously considered AR as a tool to assist employees to perform their daily work tasks. Value creation literature identified t hat c reating u nique experiences also produced employee benefits, s uch a s i ncreased satisfaction, engagement and loyalty (Grissemann & Stokburger-Sauer, 2012). AR presents many opportunities for the tourism sector to create organisational value, but further exploration of its potential is necessary.

The identification o f n ew A R v alue d imensions c learly s hows that there are a number of missed opportunities considering that previous research (e.g. Chiabai et al., 2013; Jiang & Kim, 2015; tom Dieck & Jung, 2017) identified social, environmental o r even cultural factors to name a few. However, this could be linked to limited knowledge of participants with regards to AR functionality and how it could be utilised by industry to create value for customers and organisations themselves. Consequently, this study demonstrates a need for further research to inform industry about the opportunities of AR and factors that may in fact reduce the added value of AR, such as losing appreciation and awareness of real world surroundings, heightened expectations as well as information overload. Whilst this study explored AR value creation for tourism, future studies should further examine factors that detract from AR value.

Similarities are evident between this study and findings from previous research. For instance stakeholders revealed AR presented the opportunity to create economic value, increasing sales and providing opportunities for tourism suppliers to sell more expensive options by allowing tourists' to visualise the intangible. Sørensen and Jensen (2015) supported that involving tourists in the value co-creation process increased their willingness to pay a premium. Similarly, Han et al. (2019) reported the need to include tourists in the development and implementation of AR to create meaningful tourism applications. With regard to epistemic value, stakeholders perceived AR would fulfil tourists' desire for knowledge, providing valuable information. Literature supports that in response to increased spill-overs between daily life and travel experiences, a new form of modern tourist has emerged, seeking tailored and personalised information (Kounavis et al., 2012). Further, research recognises the impact technologies have had on tourists' behaviours, information searching, purchasing, selection, evaluation, sharing and experiences (Sigala, 2018; Ukpabi & Karjaluoto, 2016; Wang et al., 2014). As well as capture and retain tourists' attention through the provision of more engaging and interactive content (He et al. (2018); Scarles et al., 2016). This study confirmed the epistemic value of AR as a tool to increase access to information, fulfilling the desire for knowledge, motivation to travel and as a novelty factor to increase competitive advantage. This reinforces the advantages of AR, in comparison to traditional forms of media, such as text and audio. Furthermore, this study strengthened ARs ability to provide value to tourists, managing realistic expectations and minimising fear of the unknown pre-experience, as well as providing better information and enhanced experience during. Jung and tom Dieck (2017) also found that introducing AR can improve tourists pre and during experiences. Hence, this study strengthens and adds credibility to existing literature, confirming that AR can create tourist, economic and epistemic value.

There was a common agreement among all online travel agents, traditional tour operators, hoteliers and online review agent stakeholder groups of ARs key value dimensions. However, some differences of opinion with regard to the most important AR tourism value dimensions were evident. It emerged that hoteliers placed the most importance on the AR tourist value dimension, perhaps because of their focus on creating valuable service encounters. Another finding was that online travel agencies placed the greatest importance on organisational and economic value, possibly because of their emphasis on remaining competitive and profitable in the highly saturated online travel agency market. Whereas, traditional tour operators emerged as most interested in ARs marketing and organisational value. One reason for this could be attributed to their efforts to compete with online travel agencies by offering novel and exciting marketing campaigns. In total, there was agreement among all stakeholders towards ARs value potential in the tourism industry and whilst some comparisons can be drawn between stakeholders, it is recommended future research explores comparisons between stakeholder groups in more depth.

5.2. Theoretical implications

This study makes a number of theoretical contributions. The field currently lacks exploration of ARs value in a tourism context, this study therefore contributes to this limited research by examining AR value in

tourism from tourism managers' perspectives. This also contributes to theory, improving understanding of tourism suppliers' perspective towards the adoption of new technologies, such as AR. Previous research found different value dimensions (see Table 1) in comparison to the present study which identified marketing and organisational as new value dimensions within the AR tourism context. These can be considered the main theoretical contributions, because all tourism managers agreed the marketing and organisational value of AR to be immensely important. Theoretically, the five dimensions explored within this paper can used for the development of a new value framework and tested on a large scale to generalise findings. In addition to the two newly identified AR value dimensions, findings from this study strengthen and add value to the credibility of existing research outcomes, such as economic, epistemic and tourist value dimensions, adding to the pool of knowledge in the tourism domain.

5.3. Practical contributions

Practically, these findings provide important implications for tourism managers with regards to AR implementation strategies and identify a need to further understand ARs tourism marketing potential and ability to improve organisations. The present study outlines a number of ways AR can be introduced to create value. For instance, it is suggested tourism managers explore opportunities to integrate AR into their existing marketing materials, through marker based AR (e.g. QR codes). This would provide alternative information in a more engaging and informative format, improving tourists' appreciation and potentially upselling more premium products and services. Hence, tourism managers can benefit from the findings to inform the effective adoption of AR in the tourism sector. Identification of ARs tourism value dimensions will help to reduce the perceived risk associated with large investments, to ensure more tourism organisations address the need to implement technologies, such as AR into their business, contributing to increased longevity, competitiveness, sustainability and profitability. This study improves understanding of ARs implementation in a tourism context, decreasing the risk associated with implementation as identified by tom Dieck and Jung (2017). The findings illustrate a number of AR strategies tourism organisations could pursue to create added value, for instance using AR to improve communication and accuracy of information between stakeholders, or increasing sales and competitive advantage by using AR to provide a more authentic and realistic appreciation of products and services. As such, the present study addresses Hassan and Rahimi (2016) call to further explore ARs potential in the tourism sector, illustrating a number of ways AR can be implemented for tourism organisations to better their existing products and services. In addition, application designers can benefit with regards to content and function requirements in order to ascertain that value is achieved. Moreover, the study revealed some factors that detract from the AR experience (e.g. information overload, heightened expectations) identifying things organisations should avoid which could reduce the value of AR. In tourism, there is a delicate balance between providing an authentic, as well as entertaining, educational and informative experience. AR should therefore be an unobtrusive experience, which offers the right amount of information. The nature of AR, usually requiring tourists to use their own devices, makes it an ideal technology to overcome some of the often discussed limitations in terms of "overloading" tourists with digital content.

5.4. Limitations and future research

The main limitation lies within the study design because only managers of tourism and hospitality businesses were interviewed, hence only the supply side perspective was taken into account. Future research should incorporate the demand side perspective in order to fully understand how value can be achieved, and to gain a holistic picture of the AR value situation. In addition, this study used a qualitative design to explore the five value dimensions. This limits the generalisability of findings and it is recommended future research should quantitatively confirm these findings. Therefore, future research is recommended to extend the study scope to incorporate the perceptions of multiple stakeholders. In addition, different tourism contexts (e.g. cultural heritage and transport providers), may reveal further value dimensions as shown in Table 1. Therefore, the AR specific value dimensions identified in this study should not be considered exhaustive and further context specific research is recommended. We recommend to conduct further interviews within other tourism contexts in order to gather more in-depth insights into the value of AR in this particular sector, as well as factors that could detract from the AR experience. Another limitation relates to the number and length of interviews. Due to interviewees' profiles and interview location, there was only limited time allocated to conduct the interviews. Consequently, future research should consider conducting in-depth interviews in order to further explore the subject of AR value. In addition, triangulation could be employed in order to improve the enhance validity of the findings. Finally, it is suggested to test the five value dimensions identified in this study in future research, to strengthen the generalisability of the findings.

Appendix A. Appendix

Interview questions.

1	What do you know about AR? - Have you used AR? - In what way?
2	How do you think an AR app could add value to the tourism industry in general and your business in particular? - Why? - How?
3	In what way do you see an AR app having a beneficial impact on the tourism industry?
4	How do you think AR could be used to benefit your clients / visitors?
5	How could AR be used to improve relationships and communications within your business / industry?
7	Do you see any problems with using AR in the tourism industry in general and your business in particular?
8	Which departments would be responsible for AR activities?
9	How do you think AR could create competitive advantage?
10	In what ways do you think AR could help increase income?

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