Virtual Pets Want to Travel: Engaging Visitors, Creating Excitement

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Abstract

This paper proposes a gamified approach to promote tourism attractions based on users' interaction with a virtual pet in the context of an AR mobile application. *Technology Acceptance Model*, *6-11 Framework* and *Persuasive Systems Design* are combined, to extract factors influencing the intention to travel with the virtual pet. A survey questionnaire was developed and administered online to 539 participants. Outcomes of this study highlight the significant role of emotional attachment and rewarding experience towards intention to travel with a virtual pet. The outcomes also helped us to develop a new 'Intention to Travel' (I2T) model. To interest and excite prospective visitors, a design of a mobile game with Augmented Reality (AR) features is proposed which will involve engaging interactions with virtual pets to attract visitors to desired location(s). Practitioners such as game developers and tourism policy makers may consider the virtual pets as a vehicle to impact tourists' behavior.

Key Words: Augmented Reality, Virtual Travel Companions, Mobile Games, Virtual Pets, Tourism Marketing, Technology Acceptance Model, 6-11 Framework, Persuasive Systems Design

1. Introduction

Technological innovations continue to be used to reach out to prospective tourists to kindle an interest or desire to travel (Linton and Kwortnik, 2019). Mobile technology using 3D, 4D, geotagging and geocaching navigational advances allows for intense virtual and augmented realities engagements. In the same breadth, technology has also become even more relevant in the marketing of destinations and attractions (Kotoua and Ilkan, 2017; Xu et al., 2016). Several scholarly writings have explored and studied the extent to which Augmented Reality (AR) can be useful in creating virtual or real experiences that are emotional, engaging and enjoyable for travelers and also integrate gamification into marketing such as loyalty programs (Hwang and Choi, 2020; Pakanen and Arhippainen, 2014; Sekhavat and Zarei, 2018; Yung et al., 2021; Yung and Khoo-Lattimore, 2019). This paper explores the introduction of virtual pets as a travel companion through a mobile application to create excitement as a marketing tool to lure visitors to a destination or an attraction.

The idea of a virtual pet is in sync with recent developments in technology given that people from various age groups are using mobile and desktop games. Virtual pets are digitally simulated characters with animal like features which are capable of eliciting socio-emotional relationships with users (Lin et al., 2017a; Tsai, 2008). Virtual companions via digital devices are becoming part of human lives and tourist activities (Ivanov et al., 2017). Virtual companion based game such as Pokémon Go created excitement due to its fun exploration and competitiveness, and motivated people to travel to different destinations to increase their in-game level (Althoff et al., 2016; Zsila et al., 2018). Interactions with a virtual pet possibly trigger a desire to attain travel experiences at a specific destination (Skinner, Sarpong & White, 2018; Vidal, 2019). Our overarching research question is, then, whether adding a virtual pet embedded in a game application and associated with a destination, be of interest to prospective visitors and attract them to the destination. Firstly, this paper intends to understand if game players would develop an interest in travelling to a destination with a virtual pet as a companion. Secondly, this research also intends to get an insight from prospective players on the features that would facilitate the interaction of a virtual pet with the game player and create an attachment which in turn would trigger an intention to travel with the virtual pet. This study contributes to our understanding of how technology can be successfully used to market travel destinations to the tech-savvy consumers.

We propose that the influence of a virtual pet will be evident and impact pre-, onsite-, and post-visit of the tourist experience. In the pre-travel stage, the virtual pet will trigger the intention to travel using various parameters such as emotional attachment with the pet, competitive features in the game and the engagement with the game. During the onsite visit to the destination, the tech savvy traveler will enjoy the companionship of the virtual pet as part of their travel experience. And finally, upon returning home, further companionship (i.e., additional game activities) will remind the travelers of their experiences with the virtual pet at visited destinations.

The theoretical contribution of this paper is to establish an understanding of the relationship between virtual pets as travel companions and the prospective traveler to stimulate destination travel interests. Also, by understanding prospective visitors' interests in virtual travel companions, the paper proposes key considerations in the design concept which can be adapted by practitioners both in tourism and technology companies to target specific destinations or attractions.

2. Literature review

Technology can be used to transform tourist's behavior and as a tool to persuade tourists to visit places (Skinner, Sarpong & White, 2018; Linton and Kwortnik, 2019). Perhaps this is why destination marketing organizations (DMOs) and tourist businesses are leveraging technology at every stage i.e., before, during and after a trip (Amadeus, 2011; Okazaki et al., 2012). The use of technology starts with 'pre-travel' stage when a person starts planning about visiting a destination and explores hotel and travel bookings and intended destination. This is followed by 'on-site' stage where the traveler uses technologies when searching for information on mobile or virtual kiosks to know more about the destination of interest. The third stage which is the 'post-travel' stage includes engagement with technology when user provides feedback, online reviews or recommendations to other prospective travelers (Okazaki et al., 2012). The integration of technology in all three stages of travel experience provides a window of opportunity wherein, a well-designed virtual pet can be introduced to the potential traveler as a travel companion.

Game like elements increase visitor loyalty, engagement and heightened awareness about the destination (Sever et al., 2015). Dubois and Gibbs (2018) also identified a significant link

between video games and destination travel motivations. Intrinsic motivation was enhanced by incorporating game like elements like animated characters, badges, rewards within the overall travel experience (Xu et al., 2016; Yildirim, 2017). Gamification of tourism destinations helps with increasing user engagement, as found in the case of Pokémon Go, where the game users went to different tourist locations motivated by their desire to engage with the game character (Yang et al., 2018). Huang et al. (2016) too found that by using 3D animation for promoting destinations helped in attracting potential visitors to a destination by enhancing their interactions with the tourist destination.

There is an emerging scholarship on implementing AR for user experience (Han et al., 2014; Linaza et al., 2014; Tussyadiah, 2014; Sekhavat and Parsons, 2018), use of games in tourism (Khamzina et al., 2020; Lacka, 2020; Lee, 2019; Xu et al., 2014) and for the purposes of marketing (Garcia et al., 2019; He et al., 2018; Lacka, 2020). A consumer evaluation study reveals that the tourists have mixed responses to various kinds of services provided by inanimate service providers, where they would prefer them in some services but do not feel secure with them in other services like check-in processing (Tussyadiah & Park, 2018).

Augmented reality-based games can be used for enhancing the user experience in urban heritage sites and it has been argued that, if implemented properly, they have high potential of engaging the travelers effectively (Chung et al., 2015; Tom Dieck and Jung, 2017). Interactive games were used as an effective informative tool to combine education and entertainment for engaging visitors at heritage sites and museums (Ballagas et al., 2008; He et al., 2018; Tsai, 2019). Zach and Tussyadiah (2017) have studied the influence of Pokémon Go in the tourism context and found that there is a lot of potential in mobile AR gaming for tourism as the players were willing to travel anywhere with enthusiasm to play the games (Alha et al., 2019). In another study, Aluri (2017) found that Pokémon Go could be useful for destination experiences during and post travel experiences.

There is no empirical evidence to confirm that gamification can motivate or prompt the user to respond positively in all tourism business processes (Lee, 2019). While travel intentions are confirmed through video games (Dubois and Gibbs, 2018), there still exists a gap where innovations such as a virtual travel companion can also be a way for DMOs to trigger travel intentions among travelers. Studies thus far have not identified factors influencing visitors' intentions to travel during the pre-travel stage using a game application that has a virtual travel

pet. The present study aims to explore the key factors that motivate game players to travel to a destination with a virtual pet.

3. Theoretical Models

To capture the intentions to use a novel technology, Technology Acceptance Model (TAM) (Davis et al., 1989), is one of most popular models of consumer behavior. TAM captures the perception of usefulness and user-friendliness to users and their attitude towards adoption of the new technology. This model hypothesizes that a user's intention is the immediate predictor of their usage behavior. Davis et al. (1992) also found usefulness and enjoyment to be significant determinants of behavioral intention. The TAM has been adopted with context specific external factors in multiple research areas including AR (Huagstvedt & Krogstie, 2012), tourism (Ayeh et al., 2013, Matikiti et al., 2018; Sahli and Legohérel, 2016) and mobile apps (Gao, Rohm, Sultan & Huang, 2012). The Unified Theory of Acceptance and Use of Technology (UTAUT2) model, is an extended TAM model of particular relevance for Augmented Reality applications, because it includes hedonic motivations as one of the factors affecting usage intention (Venkatesh et al., 2012).

The 6–11 Framework (Dillon, 2010) aims at offering a prescriptive analysis of how users' emotional engagement and attachment may develop within the context of computer games by linking their basic emotions (e.g., happiness, anger, pride etc.) and instinctual behaviors (e.g., competitiveness, aggressiveness, curiosity etc.) to the activities that are performed within the game. Since its inception, the 6–11 Framework has been used extensively in both academia and industry as an easy-to-use tool to analyse and discuss game features.

Persuasive system design (PSD) involves use of software features like rewards, competition that enable voluntary creation, changing or reinforcement of attitude or behavior among users (Oinas-Kukkonen and Harjumaa, 2009). The design proposed that persuasion principles should be considered mainly as requirements for software qualities for instance, addition of persuasive features in the mobile apps like competitions, rewards, personalization, social comparison are used to influence the user behavior.

3.1. The present study

Past research showed that Augmented Reality based tourism had a significant impact on travelers' intention to visit destinations (Han et al., 2014). Gamification of tourism can in fact make the experience richer and contribute to a higher level of satisfaction in user (Zhuo-Wei, 2019). Therefore, it is proposed that interactions with a virtual pet will result in meaningful experiences for the user while at the same time making the whole experience fun and enjoyable leading to heightened engagement which will be a key driver of intention to travel with the virtual pet. We therefore hypothesize that travelers' engagement with the game will increase their intention to travel. Cognitive and affective responses were identified as strong mediators of attachment and intentions to visit a destination (Kim et al., 2020). While interacting with a virtual pet embedded within the game, a user can become emotionally attached to the pet and can consider it as a travel companion. Emotional attachment was found to be an important factor influencing the pet owner's decision to take the pet on their holiday (Kirillova et al., 2015). Since, attachment can have a significant effect on consumers' behaviors and decisions (Orth et al., 2010; Ramkissoon, 2015), it is proposed that attachment as a result of enhanced engagement with the virtual pet also will encourage the player to travel with it to a tourist destination. Games containing challenges and competitions can motivate players to achieve goals and work towards attaining the rewards (Zhuo-Wei, 2019). These rewards can be either intrinsic or extrinsic and can include hedonic benefits, emotional benefits, or social benefits. A well-designed game that includes such rewards can influence tourist behavior (Han et al., 2018; Kim and Hall, 2019). Therefore, our hypothesis examines if a rewarding experience with the game would motivate a user to travel with the virtual pet.

Prior experience with technology can make a person feel more confident when using different applications. With the increased use of smart phones, a majority of users have prior experience with technology in one form or the other so much so that gaming is now an important aspect of modern culture (Anderson, 2015; Nielsen, 2016). Familiarity with Pokémon Go as a traditional game resulted in quick adoption of Pokémon Go as a travel guide (Aluri, 2017). We can therefore assume that past experience with virtual pet based mobile games will result in higher intention to travel with the virtual pet.

The adoption or use of technology varies across ages and gender. Findings indicate that older adults are generally less likely to use technology than younger adults (Czaja et al., 2006). The latest studies incorporating Technology Acceptance Model, reviewed the different age groups of 18–25, 26–35, 36–45 similarly found differences among the different age groups along with their income, education background and travel experiences (Li and Chen, 2019; Yeh, Pai & Jeng, 2019). Females have generally shown more acceptance and enthusiasm when engaging with new technologies as compared to males (Dirin et al., 2019; Kaplanidou and Vogt, 2006; Střelák et al., 2016). The study will also explore age and gender difference in intention to travel with a virtual pet as a companion.

There is a paucity of works exploring users' preference to use virtual pets over real pets. If the virtual pet embodies characteristics like a real pet, then there is a possibility of human interest and preference for the virtual pet. The Theory of Mind (ToM) suggests that humans tend to have a desire or intention to interact with machines if there is a higher-level semblance of human-likeness behavior (Krach et al., 2008). A more recent study by Yang and Lee (2019) finds that people are more inclined to use virtual assistance if they find them to be useful and offering a degree of enjoyment. Although pets have a very special place in modern families, travelling with them involves constraints that might not make them convenient travel companions (Dilek et al., 2020; Kirillova et al., 2015). In this case it is assumed that due to lack of constraints and restrictions on travelling with virtual pets, users might find it more convenient to travel with virtual pets rather than real pets.

Combining the three abovementioned models, the study proposes a new model that will explain Intention to Travel among the users of an AR based game app involving a virtual pet. As shown in Fig. 1, the model borrows specific elements from TAM (perceived usefulness, perceived enjoyment), 6–11 framework (joy, care, competition) and PSD (competition, rewards). These elements were then merged to give three main constructs- Engagement with the game, Emotional Attachment with Virtual Pet and Rewarding Experience.

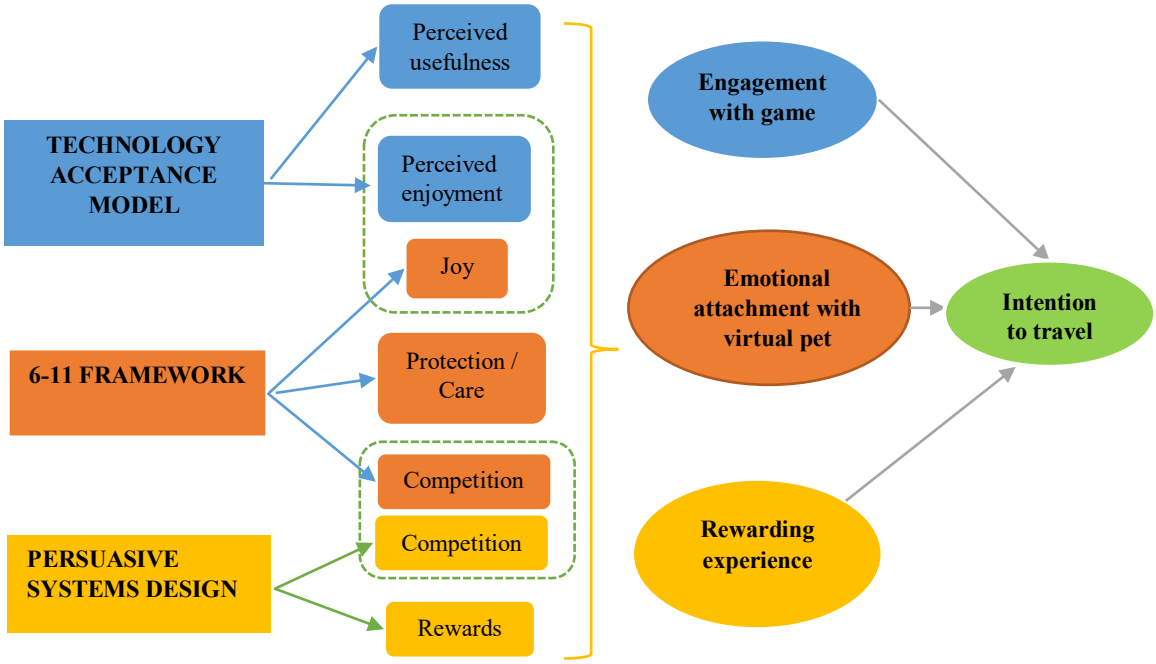

Fig. 1. Proposed Model adapted from TAM (Davis, 1989), 6–11(Dillon, 2010) and PSD (Oinas-Kukkonen and Harjumaa, 2009).

The following research hypothesis were derived based on the proposed model and the review of the extant literature.

H1. Prospective traveler's engagement with the game will increase their intention to travel.

H2. The greater the emotional attachment with the virtual pet, the higher the intention to travel with the virtual pet.

H3. Prospective Traveler's rewarding experience with the game increases their intention to travel with the virtual pet.

H4. The experience of gaming with the virtual pets in the past positively influences the intention to travel with the virtual pet.

H5. Intention to travel with a virtual pet is greater for younger people.

H6. Females have a higher intention to travel with a virtual pet than males.

H7. Preference to travel with a virtual pet is higher than to travel with a real pet.

H8. 'Emotional attachment with the Virtual Pet' and 'Rewarding experience' will mediate the relationship between 'Engagement with the game' and 'Intention to travel with the virtual pet.'

4. Methodology

The present study used a correlation design to establish relationships among the study variables and to predict intention to travel with virtual pets.

4.1. Participants

A total of 561 respondents, aged 18 years and above, completed the online survey. 22 survey responses were rejected due to being incomplete. The final data included responses from 539 participants (M=163, F=376). The demographic details of participants are presented in table 1.

Table 1. Demographic details of the participants

Demographics	Categories	N
Age in years	18-25	96
	26-35	136
	36-45	125
	46 & above	182
Gender	Male	163
	Female	376
Total		539

Note: N=Number of participants

4.2. Instrument: Survey

The measure was designed to evaluate intention of the participants to travel with virtual pets. The tool is based on the elements present in Technology Acceptance Model, 6–11 Framework and Persuasive Systems Design, the researchers developed a questionnaire, wherein three constructs were identified to be included in the questionnaire namely Engagement with the game, Rewarding experience, and Emotional attachment with the virtual pet. More than five items were generated for each of the identified theme, so that we had the flexibility in dropping some items during the Exploratory Factor Analysis (EFA) if needed. After a brainstorming session, a total of 22 items were shortlisted for the survey (e.g., “Do you think that the virtual pet can be entertaining and informative?”, “A competition can lead to the formation of friendship with the virtual travel pet”, “The virtual pet may mean a lot to me”). Items for the

survey were written from the users' perspective and measured the participant responses on a 5-point Likert scale.

Apart from the survey questions the participants were also asked their opinion on virtual pet-based game applications for tourism purposes in an open-ended question. The survey questionnaire can be found in the Appendices. The participants were also asked to indicate their intention to travel with a virtual pet through three items, which measured their responses on 5-point Likert scale. The responses were added to indicate the overall score of intention to travel with higher score indicating higher intention to travel.

The Intention to Travel (I2T) scale (Appendix 2) consists of three items on 5-point Likert Scale which checks for the players intention to travel with the virtual pet. The scale has high internal consistency with Cronbach alpha of 0.91. A higher score on this scale indicates higher intention to travel. The questionnaire collected data on participants' age, gender, whether they were familiar with virtual pets and mobile apps.

4.3 Procedure

The study was approved by the university's Human Research Ethics Committee (Approval no. H7925). Survey was uploaded on an online platform, Qualtrics, for all participants to access via a URL. Once the participants accessed the link, they were directed to an information sheet, which gave them information about the study. Those participants who agreed to participate in the study gave their informed consent and proceeded to complete the questionnaire. The participants first completed demographic questions followed by questions seeking information regarding their familiarity with virtual pets and mobile apps. They then went on to complete the questionnaire. The whole process took approximately 10 min to complete. The results were recorded, and the data was analyzed through IBM SPSS Statistics software version 27. NVivo 12 was used to analyses the qualitative data. Microsoft Excel 2016 was used for data cleaning.

5. Results

Data distribution was first checked with descriptive statistics for a sample of 539 participants. Exploratory factor analysis was conducted to understand the dimensionality of factors influencing intention to travel with virtual pets. The Principal Axis Factoring and Promax with

Kaiser Normalizations were employed as the extraction and rotation method, respectively. While factor loadings of 0.7 or greater are considered as significant, factor loadings of 0.45 or greater can be considered as adequate indicators for that factor (Hair, Black, Babin, & Anderson, 2009; Tabachnick and Fidell, 2007). Items with factor loadings below .45 were suppressed in the SPSS during the analysis.

The preliminary analysis of data was conducted to check if assumptions were met and if the data was suitable for EFA. The Kaiser–Meyer–Olkin (KMO) measure of Sampling Adequacy was .911, which indicated that the factorability of the matrix could be considered marvelous (Kaiser & Rice, 1974). The Bartlett's Test of Sphericity was significant indicating that it was appropriate to factor analyses the matrix. The diagonal elements of the anti-image correlation matrix were all observed to be greater than .50, as recommended by Field (2018).

The first round of the EFA was performed on 22 items and three factors were revealed with Eigenvalue>1. However, closer examination of pattern matrix showed that 8 items loaded on more than one factor. Those items were then removed and second EFA was run. The final EFA gave a 3-factor solution having 14 items which accounted for 76.5% of the total variance in the factor analysis (Table 2). 'Rewarding Experience' accounted for 50.19% of the total variance, 'Engagement with virtual pet' contributed to 17.74% and 'Emotional Attachment' explained 8.6% of the total variance.

Table 2. Results of exploratory factor analysis n=539

Item No	Items	Factor loadings		
		RES	EGS	EAS
Factor 1: Emotional attachment (EAS)				
3_1	I may feel very attached to virtual pet.			.948
3_2	Virtual pet may mean a lot to me.			.917
3_3	I can take care of virtual pet.			.728
3_4	I can spend time with the virtual pet.			.816
Factor 2: Engagement with the virtual pet-based game (EGS)				
6_4	Will Interaction with Virtual pet be fun for you?		.905	
6_5	Will playing with Virtual travel pet be enjoyable for you?		.933	
6_6	Do you think that Virtual pet can be entertaining and informative?		.935	

6_7	Will you play games with your virtual pet?		.885	
Factor 3: Rewarding experience (RES)				
7_1	A competitive game with virtual travel pet will inspire me to excel.	.858		
7_2	If I win in game competition with my virtual travel pet, I will feel more powerful as a person.	.832		
7_4	A competition can lead to the formation of friendship with the virtual travel pet.	.847		
7_5	Teaming up with your virtual pet for a competition in a game will be exciting.	.885		
7-6	If you win in a game or get rewards in virtual pet-based game, would you experience fulfilment?	.832		
7_7	Will you engage with the virtual travel pet-based game if there are rewards?	.804		

Note: Only Factor loadings >.45 are displayed

EAS = Emotional attachment, RES=Rewarding Experience, EGS=Engagement with the virtual pet-based game

5.1. Internal consistency

To evaluate the internal consistency of the scale, Cronbach alpha was computed. The overall Cronbach alpha for the survey was 0.74. The Cronbach alpha for 'Rewarding experience' was 0.92, 'emotional attachment with the virtual pet' was 0.91 and 'engagement with the game' was 0.95.

5.2. Relationship among variables

In order to establish a relationship among the three subscales of 'travel with virtual pet scale' (Appendix 1) and the 'intention to travel', Pearson correlation was computed (Table 3). Results showed that 'Engagement with the game' had moderate negative correlation with 'intention to travel', 'Rewarding Experience' and 'Emotional Attachment'. Therefore, H1 was not supported.

Table 3. Descriptive Statistics and Correlations of all Variables

Variables	1	2	3	4
1. ITS	-			
2. RES	**0.83****	-		
3. EAS	**0.56****	**0.57****	-	
4. EGS	**-0.33****	**-0.32****	**-0.54****	-
M	8.33	16.70	9.90	13.80
SD	3.37	5.99	4.40	4.61
Range	3-15	6-30	4-20	4-20
Variance	76.52%	50.19%	17.74%	8.6%
Eigenvalue	-	7.53	2.66	1.30

Note. ITS = Intention to travel scale; RES = Rewarding Experience subscale; EAS = Emotional attachment subscale; EGS = Engagement with game subscale. Correlations that are significant at .01 are bolded. ** p <0.01.

The 'Emotional attachment' was significantly correlated with 'intention to travel', and the relationship was positive and moderate. On the other hand, 'rewarding experience' was strongly correlated with 'intention to travel' with the potential to get some reward strongly influencing the intention to travel with the virtual pet. Therefore, H2 and H3 were supported.

An independent t-test was done to examine whether past experience of gaming with the virtual pets affected the intention to travel with the virtual pet as a travel companion. Though the results were significant ($t(537) = -6.67$, $p < 0.001$), they were not in the direction hypothesized by us. Participants with no experience with virtual pets (n = 206) had higher intention to travel (M = 9.52, s.d. = 3.5) than participants (n = 333) with experience of gaming with virtual pets (M = 7.60, s.d. = 3.08). Therefore, H4 was not supported.

A one-way ANOVA was computed to see if 'intention to travel with virtual pet' differed across different age groups. Though 'intention to travel' significantly differed across groups with people from 46 and above age group showing highest intention to travel (M = 8.81, s.d. = 3.57) as compared to participants from 18 to 25 age group (M = 7.64, s.d. =3.02), the difference was not significant after Bonferroni correction was applied. The results therefore did not support H5.

An independent t-test revealed that there was no significant Gender difference in intention to travel with a virtual pet t (537) = 0.09, p = 0.93. Therefore, H6 was not supported.

Chi Square Goodness of Fit was used to analyse if there was any significant difference in number of people preferring to travel with a virtual pet as compared to real pet or no pet. The results showed that significantly more participants (n=297) reported their preference to travel with real life pet as compared to virtual pet (n=145) and no pet (n=97), $X^2(2, N = 539) = 121.35$, p<.001. Thus, H7 was not supported.

A serial multiple mediation assumes that there is a relationship among mediators (Hayes, 2013). To test for a serial multiple mediation, ordinary least squares regression was calculated using the SPSS macro-PROCESS (Hayes, 2013). PROCESS allows for multiple mediator variables and can construct bias corrected bootstraps. This study employed a serial multiple mediation (model 6) with the significance level set at $p < 0.05$ and 10,000 bootstrap samples for model 6, as recommended by Hayes (2013). For the present study, the mediating effect of Emotional attachment with the virtual pet and Rewarding experience on relationship between Engagement with the game and Intention to travel was examined. The data was checked for assumption violation and 7 participants were removed due to Mahalanobis distance greater than the critical value. Data from 532 participants was finally analyzed. The results showed that regression of 'Engagement with the game' on 'Intention to travel with the virtual pet', ignoring the mediator was significant ($\beta = -0.25$, t (530) = −8.42, $p < 0.001$, 95%CI [−0.31, −0.19]). Engagement with the game to mediators, Rewarding experience (a1), $\beta = -0.46$, t (530) = −8.69, $p < 0.01$, 95%CI [−0.56, −0.35] and Emotional attachment with the virtual pet (a2), $\beta = -0.34$, t (529) = −10.83, $p < 0.001$, 95%CI [−0.40, −0.28] were at significant levels.

Rewarding experience as the first mediating variable on the second mediating variable, Emotional attachment with the virtual pet, was significant as well (d21) $\beta = 0.36$, t (529) =15.12, $p < 0.001$, 95%CI [0.31, 0.40]. The effects of mediating variable on Intention to travel with the virtual pet showed that Rewarding experience (b1) $\beta = 0.43$, t (528) =25.58, $p < 0.001$, 95%CI [0.40, 0.47] and Emotional attachment with the virtual pet (b2) $\beta = 0.08$, t (528) =2.94, $p < 0.001$, 95%CI [0.03, 0.13] were at significant levels. The analysis showed that while controlling for the two mediators, Engagement with the game was not a significant predictor of Intention to travel with the virtual pet (direct effect c') $\beta = -0.01$, t (528) = −0.71, $p = 0.48$, 95%CI [−0.05, 0.03].

Fig. 2 illustrates the model showing the mediation effect of Emotional attachment with virtual pet and Rewarding experience on Intention to travel with virtual pet. Since the direct effect was not significant, Rewarding experience and Emotional attachment with the virtual pet completely mediated the relationship between Engagement with the game and Intention to travel with the Virtual pet. Therefore, H8 is supported.

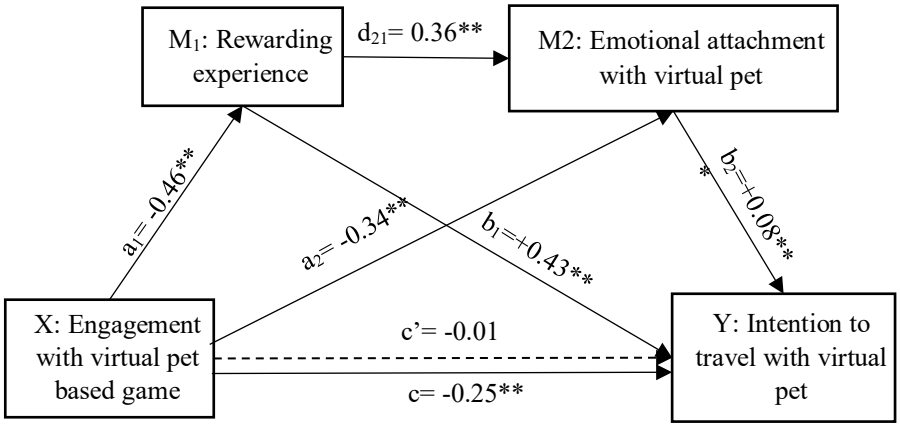

Fig. 1. Mediation effects of Emotional Attachment with virtual pet and Rewarding Experience on Intention to Travel with virtual pet.

In a largely open-ended question: "What are your thoughts about virtual pets as a travel companion?" the respondents have mostly given a positive response, commenting the idea to be interesting experience and entertaining. Using the Sentiment Analysis with the Microsoft AZURE software (added in Microsoft Excel), 63.1% participants gave a positive response, 27.1% gave a negative response and 9.8% gave a neutral response. Only a few respondents have rejected the idea of a virtual travel pet altogether. These unfavorable responses towards the use of a virtual pet as a travel companion perhaps, reflect our humanistic side of social being as human and technology relationships continue to evolve.

This pictorial representation of key words used by the respondents when responding to an open-ended question suggests a largely positive reception or favorable opinion on thoughts about virtual pets as a travel companion as shown in the word cloud depicted in Fig. 3. Some of the responses are "They can add to the journey experience in both practical and emotional ways."

Fig. 3. Word cloud for opinion on game involving virtual travel pet.

This pictorial representation of key words used by the respondents when responding to an open-ended question suggests a largely positive reception or favorable opinion on thoughts about virtual pets as a travel companion as shown in the word cloud depicted in figure 3. Some of the responses are "They can add to the journey experience in both practical and emotional ways."

A minority of respondents did describe the idea as 'weird' and 'silly' and are unable to imagine the virtual pet. Sample responses include the following:

"not sure, i find this rather weird for an adult and maybe even not healthy for a child."

"I'm not sure about virtual pets. I adore dogs - so perhaps a virtual dog would make a refreshing, new travel companion. Whether virtual animals make appropriate travel companions - well this remains to be seen. "

Though largely positive, there are a good number of prospective travelers and users of 'virtual pet' who are skeptical about its purpose and use as a companion.

6. Discussion

6.1. Theoretical Implications

The present study examined how ‘Engagement with the game’, ‘Emotional attachment with the virtual pet’ and ‘Rewarding experience’ predicted the users' Intention to travel with the virtual pet. The results showed that engagement and experience with the game did not predict Intention to travel with virtual pet. Age, gender, preference for real pet over virtual pet too did not emerge as significant variables. Higher engagement did not predict intention to travel with virtual pet. Also, higher engagement with virtual pet predicted lower rewarding experience and lower emotional attachment with virtual pet.

However, the model also indicated that rewarding experience could increase emotional attachment with the virtual pet, which in turn would increase intention to travel with virtual pet. Though the mediators worked in the direction predicted, the relationship between the engagement with the game and mediators was not in the expected direction. This potentially indicates that if a user is already having an engaging experience with the game and they would not be seeking rewarding experience or any emotional attachment since the fun resulting out of engagement would satisfy the emotional needs and would be a reward by itself. However, if the game design involves features that offer reward or prizes then the user might develop greater emotional attachment with the virtual pet and would potentially travel with it to destinations, as is being revealed by our study's outcomes.

The outcomes of the study allow us to modify the originally proposed model to include only two elements from the earlier proposed model namely, Emotional attachment with virtual pet and Rewarding experience of the game.

The above I2T model depicted in Fig. 4 is the visualization of the relationship between the variables which contribute to the participants' ‘Intention to travel’ with virtual pet. The conceptual game design needs to incorporate the elements of emotional attachment with the virtual pet and create a ‘rewarding game experience’ to be able to translate into actionable consequence which is ‘intention to travel’ with the virtual pet. The model depicts that when the game manages to effectively establish an emotional attachment between the player and the virtual pet character, then the player will be more likely agreeable to travel to the destinations with the virtual pet. Another interesting insight revealed by the results is that rewards can be a

trigger to establish emotional attachment and motivate the player to travel with their virtual pet.

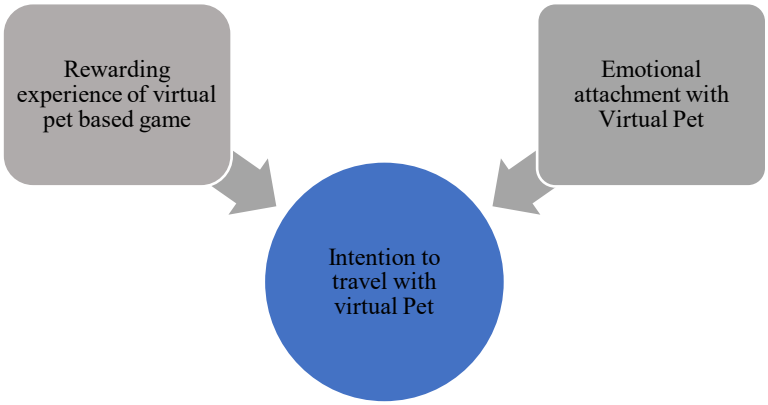

Fig. 4. Intention to Travel (I2T) Model

6.2. Managerial Implications

How can all this be turned into something actionable by a business or tourist board aiming at promoting specific attractions? Developing an engaging AR mobile game is an often-expensive endeavor. Nonetheless, based on the study outcomes an effective Virtual Companion game can be designed effectively. Specifically, the game should aim, primarily, at creating a rewarding experience for the player which will encourage the establishment of an emotional relationship between the player and the virtual pet before progressing further to entice the player to travel to a specific destination.

Available as a free mobile download, the game starts by introducing the player to their unique virtual pet, which can be modelled after a specific attraction, a known character or be something completely original.

Following the suggestions provided in (Dillon, 2014), to build an emotional connection within the context of a serious game, we believe it is important to make the player engaged via typical behavioral instincts like “protection and care” for the pet. In a way not dissimilar to the original Nintendo hit game Nintendogs (2005), the pet will introduce itself to the player and then ask to explore the environment looking for food and/or other items. Being this an AR application,

the game will display the pet as superimposed to the real images captured from the mobile camera in real time. A set of items will randomly appear nearby as the player walks and turns around, allowing the pet to go and get them. The virtual pet can induce an emotional attachment thanks to specific game features and then interest its owner/player to travel to destinations it wants to travel to be 'happy.'

Collecting such items will increase a set of stats characteristics of the pet like speed and stamina. The walking activity can be repeated regularly together with simple clicking activities, like in Ian Bogost's Cow Clicker (2010) and as described by McCaffery (1991), keeping the player constantly engaged. Once the pet stats reach a specific level, the pet will be allowed to take part into a race with randomly generated pets of similar abilities, allowing the game to engage the player also via his/her competitive instincts.

As the interactions progress and the pet's statistics increase in level, the player is likely to become more interested and committed to the game. This is the point when the "tourism" phase is finally introduced; the pet will highlight a specific venue they have to go and explore new items, and to progress further, unlocking new racing venues and increasing its statistics to the next level.

Once at the venue, the pet will incentivize the player to walk around (figure 5), describing the unique features of the place while also discovering useful items that will boost its stats. Back home, a new themed competitive venue for racing against stronger opponents will be available.

Fig 5. A virtual pet encouraging the player to walk around the Merlion in Singapore.

To achieve this sort of emotional engagement, besides the activities discussed in the previous paragraphs, the AR game can also engage the player by turning them into a trainer for competitive racing action. The player will have to take care of the pet and then look for unique items by visiting specific tourist attractions to unlock new challenges.

7. Conclusion and Future Research Directions

In this research, an Augmented Reality (AR) game design concept with persuasive features involving interactions with virtual pets is proposed, to bring the player to desired locations. Destination marketing has moved from print newspapers and magazines to digital media in a big way. Virtual pets are a medium to improve, and advance to create novel and sophisticated approaches to destination marketing strategies (Xu, Buhalis & Weber, 2017). Destination marketing companies and tourism boards can benefit greatly by such an approach and applications. These, in fact, can reach a varied range of people to deliver relevant information via channels most young adults across the globe are very familiar with nowadays, making acceptance very straightforward. In this context, this study highlights the role of virtual

travel companions which can potentially influence a prospective visitor to visit a travel destination. The established emotional attachment between the virtual pet and the player can by itself be a rewarding experience. Any further incentives offered in the potential travel experience will enhance the player's motivation to travel with virtual pet.

The limitations of this study stem from the age of participants included in this study. Due to the university ethics considerations, we did not include prospective game players less than 18 years old. Future studies can also consider the geographical distribution of respondents. The next logical step is to continue in this direction by implementing a fully working Android/iOS prototype to confirm these preliminary findings and evaluate results further. Additionally, there can also be a study to understand virtual pets with local or international popularity if that may have better traction with prospective travelers.

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References

Alha, K., Koskinen, E., Paavilainen, J., & Hamari, J. (2019). Why do people play location-based augmented reality games: A study on Pokémon GO. *Computers in Human Behavior*, 93, 114-122. https://doi.org/10.1016/j.chb.2018.12.008

Althoff, T., White, R. W. & Horvitz, E. (2016). Influence of Pokémon GO on physical activity: Study and implications. *Journal of Medical Internet Research*, *18*(12), e315. https://doi.org/10.2196/jmir.6759

Aluri, A. (2017). Mobile augmented reality (MAR) game as a travel guide: Insights from Pokémon GO. *Journal of Hospitality and Tourism Technology, 8*(1), 55-72. https://doi.org/10.1108/JHTT-12-2016-0087

Amadeus - Travel Tech Consulting, Inc. (2011). *The always-connected traveler: How mobile will transform the future of air travel*. Retrieved Sep 17, 2020, from http://www.amadeus.com/airlineIT/the-always-connected-traveller/index.html?REF=41

Anderson, M. (2015). Technology Device Ownership:, *Pew Research Center.* Retrieved November 18, 2020, from www.pewinternet.org/2015/10/29/technology-device-ownership-2015

Ballagas, R., Kuntze, A. & Walz, S. P. (2008). Gaming tourism: Lessons from evaluating REXplorer, a pervasive game for tourists. In J. Indulska, D. J. Patterson, T. Rodden & M. Ott (Eds.), *International Conference on Pervasive Computing* (pp. 244-261). Heidelberg: Springer.

Bogost, I. (2010). *Cow Clicker*. Retrieved on 9 September 2020 from http://bogost.com/games/cow_clicker/

Chung, N., Han, H. & Joun, Y. (2015). Tourists' intention to visit a destination: The role of augmented reality (AR) application for a heritage site. *Computers in Human Behavior*, 50, 588-599. https://doi.org/10.1016/j.chb.2015.02.068

Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., & Sharit, J. (2006). Factors predicting the use of technology: findings from the Center for Research and Education on Aging and Technology Enhancement (CREATE). *Psychology and aging*, *21*(2), 333-352. https://doi.org/10.1037/0882-7974.21.2.333

Davis, F. (1989).Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13 (3) (1989), pp. 319-340, 10.2307/249008

Dilek, S., Dilek, N.K., & Fennell, D. A. Travelling Companions: A Constraint Analysis of Pet Owners in Turkey. *Journal of Tourism Leisure and Hospitality*, *2*(1), 4-13.

Dillon, R. (2010). *On the Way to Fun: An Emotion Based Approach to Successful Game Design*. AKPeters, 2010.

Dillon, R. (2013). Serious games and fun: An analysis. *International Journal of Innovative Research and Development, 2*(5), 1046-1063.

Dirin, A., Alamäki, A., & Suomala, J. (2019). Gender Differences in Perceptions of Conventional Video, Virtual Reality and Augmented Reality. *International Journal of Interactive Mobile Technologies*, *13*(6), 93–103. https://doi.org/10.3991/ijim.v13i06.10487

Dubois, L., & Gibbs, C. (2018). Video game–induced tourism: A new frontier for destination marketers. *Tourism Review (Association Internationale d'Experts Scientifiques Du Tourisme)*, *73*(2), 186-198.

Field, A. (2018).Discovering statistics using IBM SPSS Statistics (5th ed.), Sage Publications Limited, London, UK .

Gao, T. , Rohm, A.J., Sultan, F. & Huang, S. (2012). Antecedents of consumer attitudes toward mobile marketing: A comparative study of youth markets in the United States and China. *Thunderbird International Business Review*, 54 (2), pp. 211-224 https://doi-org.elibrary.jcu.edu.au/10.1002/tie.21452

Garcia, A., Linaza, M. T., Gutierrez, A., & Garcia, E. (2019). Gamified mobile experiences: Smart technologies for tourism destinations. *Tourism Review (Association Internationale d'Experts Scientifiques Du Tourisme)*, *75*(1), 30-49. https://doi.org/10.1108/TR-08-2017-0131

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). United Kingdom: Prentice Hall.

Han, D., Jung, T. & Gibson, A. (2014). Dublin AR: Implementing Augmented Reality in Tourism. In Xiang, Z., & Tussyadiah (Eds.), *Information and communication technologies in tourism*, Proceedings of the international conference in Dublin, Ireland, January 21-24, 2014 (pp. 511-523). Berlin: Springer.

Han, D. I., Tom Dieck, M. C., & Jung, T. (2018). User experience model for augmented reality applications in urban heritage tourism. *Journal of Heritage Tourism*, *13*(1), 46-61.

Haugstvedt, A.C. & Krogstie, J. (2012) Mobile augmented reality for cultural heritage: A technology acceptance study. *2012 IEEE international symposium on mixed and augmented reality (ISMAR)*, IEEE (2012 November), pp. 247-255, 10.1109/ISMAR.2012.6402563

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York, NY: Guilford Press (pp. 335-337).

He, Z., Wu, L., & Li, X. (2018). When art meets tech: The role of augmented reality in enhancing museum experiences and purchase intentions. *Tourism Management,* 68, 127-139. https://doi.org/10.1016/j.tourman.2018.03.003

Heim, M. (1993). *The metaphysics of virtual reality*. New York: Oxford University Press.

Huang, Y., Backman, S. J., Backman, K. F., & Moore, D. (2013). Exploring user acceptance of 3D virtual worlds in travel and tourism marketing. *Tourism Management*, 36, 490-501. https://doi.org/10.1016/j.tourman.2012.09.009

Huang, Y. C., Backman, K. F., Backman, S. J., & Chang, L. L. (2016). Exploring the implications of virtual reality technology in tourism marketing: An integrated research framework. *International Journal of Tourism Research, 18*(2), 116-128.

Hwang, J., & Choi, L. (2020). Having fun while receiving rewards: Exploration of gamification in loyalty programs for consumer loyalty. *Journal of Business Research,* 106, 365-376. https://doi.org/10.1016/j.jbusres.2019.01.031

Ivanov, S., Webster, C., & Berezina, K. (2017). Adoption of robots and service automation by tourism and hospitality companies. *Revista Turismo & Desenvolvimento*, *27/28*(1), 1501-1517.

Kaiser, H.F. & Rice, J.(1974). Little jiffy, mark IV. *Educational and Psychological Measurement,* 34 (1), pp. 111-117

Kaplanidou, K. & Vogt, C. (2006). A structural analysis of destination travel intentions as a function of web site features. *Journal of Travel Research*, *45*(2), 204-216. https://doi.org/10.1177/0047287506291599

Khamzina, M., Parab, K. V., An, R., Bullard, T. & Grigsby-Toussaint, D. S. (2020). Impact of Pokémon go on physical activity: A systematic review and meta-analysis. *American Journal of Preventive Medicine*, *58*(2), 270-282. https://doi.org/10.1016/j.amepre.2019.09.005

Kim, M. J., & Hall, C. M. (2019). A hedonic motivation model in virtual reality tourism: Comparing visitors and non-visitors. *International Journal of Information Management*, 46, 236-249. https://doi.org/10.1016/j.ijinfomgt.2018.11.016

Kim, M. J., Lee, C. K., & Jung, T. (2020). Exploring consumer behavior in virtual reality tourism using an extended stimulus-organism-response model. *Journal of Travel Research*, *59*(1), 69-89. https://doi.org/10.1177/0047287518818915

Kirillova, K., Lee, S., & Lehto, X. (2015). Willingness to travel with pets: a US consumer perspective. *Journal of Quality Assurance in Hospitality & Tourism*, *16*(1), 24-44. https://doi.org/10.1080/1528008X.2015.966296

Kotoua, S. & Ilkan, M. (2017). Tourism destination marketing and information technology in Ghana. *Journal of Destination Marketing & Management, 6*(2), 127-135. https://doi.org/10.1016/j.jdmm.2017.04.007

Krach, S., Hegel, F., Wrede, B., Sagerer, G., Binkofski, F., & Kircher, T. (2008). Can machines think? interaction and perspective taking with robots investigated via fMRI. *PloS One, 3*(7), e2597-e2597. https://doi.org/10.1371/journal.pone.0002597

Lacka, E. (2020). Assessing the impact of full-fledged location-based augmented reality games on tourism destination visits. *Current Issues in Tourism, 23*(3), 345-357. https://doi.org/10.1080/13683500.2018.1514370

Lee, B.C. (2019). The effect of gamification on psychological and behavioral outcomes: Implications for cruise tourism destinations. *Sustainability, 11* (11), p. 3002

Li, T. & Chen, Y. (2019). Will virtual reality be a double-edged sword? Exploring the moderation effects of the expected enjoyment of a destination on travel intention

Journal of Destination Marketing & Management, 12, pp. 15-26, 10.1016/j.jdmm.2019.02.003

Lin, C., Faas, T. & Brady E. (2017). Exploring affection-oriented virtual pet game design strategies in VR attachment, motivations and expectations of users of pet games

In 2017 seventh international conference on affective computing and intelligent interaction (ACII), IEEE (October), pp. 362-369

Lin, C., Faas, T., & Brady, E. (2017, October). Exploring affection-oriented virtual pet game design strategies in VR attachment, motivations and expectations of users of pet games. In 2017 Seventh International Conference on Affective Computing and Intelligent Interaction (ACII) (pp. 362-369). IEEE.

Linaza, M. T., Gutierrez, A. & García, A. (2014). Pervasive Augmented Reality Games to Experience Tourism Destinations. In Xiang, Z., & Tussyadiah (Eds.), *Information and communication technologies in tourism 2014:* Proceedings of the international conference in Dublin, Ireland, January 21-24, 2014 (pp. 497-509). Berlin: Springer.

Linton, H., & Kwortnik, R. J. (2019). Mobile usage in travel: Bridging the supplier-user gap. *International Journal of Contemporary Hospitality Management, 31*(2), 771-789. https://doi.org/10.1108/IJCHM-10-2017-0614

Matikiti, R., Mpinganjira, M. & Roberts-Lombard M. (2018). Application of the technology acceptance model and the technology–organisation–environment model to examine social media marketing use in the South African tourism industry. *South African Journal of Information Management*, *20* (1), 1-12, 10.4102/sajim.v20i1.790

McCaffery, L. (1991). *Storming the reality studio: A casebook of cyberpunk and postmodern science fiction*. Durham: Duke University Press.

Nielsen (2016). *Gaming gone global: keeping tabs on worldwide trends.* Retrieved November, 20, 2020 from http://www.nielsen.com/us/en/insights/news/2016/gaming-gone-global-keeping-tabs-on-worldwide-trends.html.

EAD Nintendo Nintendogs (DS), Nintendo https://www.nintendo.com/games/detail/nintendogs-cats-golden-retriever-and-new-friends-3ds/

Oinas-Kukkonen, H. & Harjumaa, M. (2009). Persuasive systems design: Key issues, process model, and system features. *Communications of the Association for Information Systems*, *24* (1), 485-500. https://doi.org/10.17705/1CAIS.02428

Okazaki, S., Campo, S. & Andreu, L. (2012). Mobile marketing in tourism services. In R. H. Tsiotsou & R. E. Goldsmith (Eds.), *Strategic marketing in tourism services*, 339-357. Bingley: Emerald.

Orth, U. R., Y. Limon, and G. Rose. (2010). Store-Evoked Affect, Personalities, and Consumer Emotional Attachments to Brands. *Journal of Business Research, 63* (11): 1202–1208. https://doi.org/10.1016/j.jbusres.2009.10.018

Pakanen, M., & Arhippainen, L. (2014). User experiences with web-based 3D virtual travel destination marketing portals: The need for visual indication of interactive 3D elements. Paper presented at the *Australian Computer-Human Interaction Conference on Designing Futures: the Future of Design*, (pp. 430-439). https://doi.org/10.1145/2686612.2686680

Ramkissoon, H. (2015). Authenticity, Satisfaction, and Place Attachment: A Conceptual Framework for Cultural Tourism in African Island Economies. *Development Southern Africa 32* (3): 292–302. https://doi.org/10.1080/0376835X.2015.1010711

Sahli, A. B., & Legohérel, P. (2016). The tourism web acceptance model: A study of intention to book tourism products online. *Journal of Vacation Marketing*, *22*(2), 179-194. https://doi.org/10.1177/1356766715607589

Sekhavat, Y. A. & Parsons, J. (2018). The effect of tracking technique on the quality of user experience for augmented reality mobile navigation. *Multimedia Tools and Applications, 77*(10), 11635-11668. https://doi.org/10.1007/s11042-017-4810-y

Sekhavat, Y., & Zarei, H. (2018). Sense of Immersion in Computer Games Using Single and Stereoscopic Augmented Reality. *International Journal of Human-Computer Interaction*, 34(2), 187–194. https://doi.org/10.1080/10447318.2017.1340229

Sever, N.S., Sever, G.N. & Kuhzady, S. (2015). The evaluation of potentials of gamification in tourism marketing communication.*International Journal of Academic Research in Business and Social Sciences, 5* (10), 188-202.

Skinner, H., Sarpong, D. & White, G.R.T. (2018). Meeting the needs of the Millennials and Generation Z: gamification in tourism through geocaching. *Journal of Tourism Futures, 4* (1), pp. 93-104, 10.1108/JTF-12-2017-0060

Střelák, D., Škola, F., & Liarokapis, F. (2016). Examining User Experiences in a Mobile Augmented Reality Tourist Guide. *Proceedings of the 9th ACM International Conference on Pervasive Technologies Related to Assistive Environments*, 1–8. https://doi.org/10.1145/2910674.2935835 .

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5, pp. 481-498). Boston, MA: Pearson.

Tom Dieck, M., & Jung, T. (2017). Value of augmented reality at cultural heritage sites: A stakeholder approach. Journal of Destination Marketing & Management, 6(2), 110–117. https://doi.org/10.1016/j.jdmm.2017.03.002

Tsai, S.P. (2019). Augmented reality enhancing place satisfaction for heritage tourism marketing, *Current Issues in Tourism*, *23*(9), 1078-1083. https://doi.org/10.1080/13683500.2019.1598950

Tsai, Y. F. (2008). *The effects of interacting with a computer-simulated virtual pet dog on children's empathy and humane attitudes* (Doctoral dissertation, Faculty of Education-Simon Fraser University).

Tussyadiah, I.P. (2014).Toward a theoretical foundation for experience design in tourism *Journal of Travel Research, 53* (5), 543-564. 10.1177/0047287513513172

Tussyadiah, I.P. & Park, S. (2018). When guests trust hosts for their words: Host description and trust in sharing economy. *Tourism Management, 67,* pp. 261-272, 10.1016/j.tourman.2018.02.002

Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, *36*(1), 157-178. https://doi.org/10.2307/41410412

Vidal, B. The New Technology and Travel Revolution (2019). *Business Intelligence & Analytics*. Retrieved on October 29, 2020 from https://www.wearemarketing.com/blog/tourism-and-technology-how-tech-is-revolutionizing-travel.html

Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, 60, 244-256. https://doi.org/10.1016/j.tourman.2016.11.020

Xu, F., Tian, F., Buhalis, D., Weber, J. & Zhang, H. (2016). Tourists as mobile gamers: Gamification for tourism marketing. *Journal of Travel & Tourism Marketing*, *33*(8), 1124-1142. https://doi.org/10.1080/10548408.2015.1093999

Xu, F., Weber, J. & Buhalis. D. (2014). Gamification in Tourism. In Xiang, Z., & Tussyadiah (Eds), *Information and communication technologies in tourism 2014: Proceedings of the international conference in Dublin, Ireland, January 21-24, 2014* (pp. 525-537). Berlin: Springer.

Yang, C., Sia, W., Tseng, Y., & Chiu, J. (2018). Gamification of learning in tourism industry: A case study of Pokémon go. *Proceedings of the 2018 2nd International Conference on education and e-learning*, 191-195.

Yang, H., & Lee, H. (2019). Understanding user behavior of virtual personal assistant

devices. *Information Systems and e-Business Management, 17*(1), 65-87. https://doi.org/10.1007/s10257-018-0375-1

Yeh, T.M., Pai, F.Y. & Jeng, M.Y. (2019). The factors affecting older adults' intention toward ongoing participation in virtual reality leisure activities. *International Journal of Environmental Research and Public Health, 16* (3), p. 333, 10.3390/ijerph16030333

Yildirim, I. (2017). The effects of gamification-based teaching practices on student achievement and students 'attitudes toward lessons. The Internet and Higher Education, 33, 86-92. https://doi.org/10.1016/j.iheduc.2017.02.002

Yung, R., & Khoo-Lattimore, C. (2019). New realities: a systematic literature review on virtual reality and augmented reality in tourism research. *Current Issues in Tourism*, *22*(17), 2056-2081. DOI: 10.1080/13683500.2017.1417359

Yung, R., Khoo-Lattimore, C., & Potter, L. E. (2021). VR the world: Experimenting with emotion and presence for tourism marketing. *Journal of Hospitality and Tourism Management,* 46, 160-171.

Zach F.J., Tussyadiah I.P. (2017) To Catch Them All—The (Un)intended Consequences of Pokémon GO on Mobility, Consumption, and Wellbeing. In: Schegg R., Stangl B. (eds) *Information and Communication Technologies in Tourism 2017*. Springer, Cham. https://doi.org/10.1007/978-3-319-51168-9_16

Zhuo-Wei, T. I. A. N. (2019). Game on: Engaging tourists through Gamification. DEStech. In 2019 International Conference on Advanced Education and Management, ICAEM, Chengdu, China (pp. 503-507). https://doi.org/10.12783/dtem/icaem2019/31031

Zsila, Á., Orosz, G., Bőthe, B., Tóth-Király, I., Király, O., Griffiths, M., & Demetrovics, Z. (2018). An empirical study on the motivations underlying augmented reality games: The case of Pokémon Go during and after Pokémon fever. *Personality and individual differences*, 133, 56-66. https://doi.org/10.1016/j.paid.2017.06.024