

## Fun and functional: Can a gamified travel app win over users?

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*This current study considers gaming motivations' influence on the adoption of a gamified travel application (app) among drive tourists. Given the saturated travel app market, a need to develop value added features (such as gaming) to encourage app conversion or adoption should be of interest to travel app developers. Time spent on games as well as frequency of travel app usage were included as moderating factors. All relationships proposed by the theoretical model were supported, suggesting that existing usage of a travel app has a positive relationship with motivations to use a gamified travel app. Gaming motivations also had a positive effect on intention to download a gaming app. In addition, our findings indicate that gaming motivations fully mediated the relationship between current usage and intention to download. Also, while level of engagement with games increased the likelihood of adoption of a gamified travel app, higher usage of travel apps overall did not. This suggests that while a gamified travel app may hold general appeal, it would be best suited to the niche but significant gamer market.*

**Keywords:** Drive tourism, travel applications, gamified apps, gaming motivations, Theory of Planned Behavior

### Introduction

Globally mobile applications (apps) are projected to generate more than 935 billion U.S. dollars by 2023 (Clement, 2019a). Apps are software packages that can be installed on mobile devices and provide digital access to information, games, productivity tools, and commercial services and products (Yuan, Chih and Huang, 2016). Recent and unprecedented rates of adoption are attributed, in large part, to a parallel rise in smartphone ownership (Kim, Yoon and Han, 2016).

Apps are particularly well-suited to the tourism industry as travel is inherently information intensive and mobile (Im and Hancer, 2016). Smartphone travel apps facilitate travel by providing navigational cues as well as GPS based and real-time information about destinations (Wang, Xiang and Fesenmaier, 2014). Travel apps also offer drive tourists enhanced flexibility and convenience by facilitating *en route* planning, booking and the ability to stay connected and informed (Wang, et al., 2014).

Other tourism apps include mobile-mediated experiences. These have been categorized based on the type of interactive experience, namely, (1) verbal-based, (2) pictorial-based, and (3) 3-D whether non-interactive, interactive, or animated (Hyun, Lee and Hu, 2009). Each of these types may also have specific application at the pre-trip, *en route*, and post-trip phases (Hyun et al., 2009). Augmented reality along with gamification at destinations has also been implemented via mobile app using virtual characters designed to lead visitors through historical settings or on quests (Mesáro et al., 2016). Mobile apps may even enhance post-trip memories using a cloud-based augmented reality system, for example, which allows users to generate virtual souvenirs as well as access virtual travel experiences in interactive way (Lee, Chen and Su, 2017).

Drive tourism is already a dominant sector within the U.S. domestic travel market. According to one study, as much as 85% of vacationers opt to a take road trip over other forms of travel

(LaMondia, Bhat and Hensher, 2008). This tourism may be described as “travel by any form of mechanically powered, passenger-carrying road transport, with the exclusion of coaches and bicycles” (Prideaux and Carson, 2011, p. 3). Drive tourists may be considered hyper-mobile with nearly unrestricted land access to special interest destinations within the continental U.S., and no necessarily structured activity or time schedules (Derrett, 2002; Prideaux and Carson, 2003).

Drive tourism has also significantly shaped access to, and thus demand for, domestic tourism destinations (Prideaux and Carson, 2011). Drive tourists have been uniquely positioned to access rural or otherwise marginalized markets (Yi, Day and Cai, 2011). For local services and attractions, economic benefits have also been enhanced by drive tourists' ability to access information *en route* (Hwang and Fesenmaier, 2011). In one study of U.S. tourists, for example, 44% of survey respondents reported to have made at least one unscheduled stop while in transit (Hwang and Fesenmaier, 2011). Travel apps have enhanced these characteristics, as noted. Travel apps provide digital mapping, access to local information and travel deals, as well as the ability to make travel related purchases or reservations at almost any time and place (MacKay and Vogt, 2012; Pedrana, 2013).

Given the prodigious size of the drive tourism market (American Express, 2016), app usage and future adoption are of interest. Overall, the most frequent uses of mobile apps are messaging, information searches, social media, mapping, and gaming (Klie, 2015). Gaming was also identified as the fastest growing category in the global apps market (Hsaio and Chen, 2016). Such uses may be broadly categorized as serving utilitarian or hedonic functions (Hyun, Lee and Hu, 2009). For travel apps, utilitarian functions include navigation, and pre and post trip planning and management; hedonic functions include experiential and social media activity during a trip (Tan, Lee, Lin and Ooi, 2017).

Previous studies have indicated that both perceived usefulness (utilitarian function) and perceived enjoyment (hedonic function) predict attitudes towards mobile app usage among American consumers (Yang, 2013). A key finding of Im and Hancer's (2016) more recent study, however, was that while utilitarian functions were

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the more significant predictor, hedonic motivations played a role, “as an important catalyst for utilitarian motivations” with respect to mobile app usage (p. 177). In other words, hedonic motivations actually increased rather than detracted from the attractiveness of utilitarian functions and as a predictor of app usage.

For travel app developers, gamification may be a means by which to compete in an already saturated market (Klie, 2015; Yang and Liu, 2017). Gamification, defined as “the use of game-design elements in a non-gaming contexts,” (Baptista and Oliveira, 2018, p. 306). A gamified travel app, by extension, is one that combines utilitarian travel app functions with gaming features, game play elements, or mediated experiences (Xu, Tian, Buhalis, Weber and Zhang, 2016). Although there is an overall idea of the use of gamification travel apps, this area of research is still understudied. The present paper aims at determining the role of users’ gaming motivations, frequency, and time of app usage and the influence of those mediators on the adoption of a gamified travel application (app) among drive tourists. Subsequently, we test the mediators of gaming motivations, frequency and timing of the gaming app between drive tourists’ current usage and their intention to download the gaming app. The findings are then interpreted from a theory –building point of view and managerial implications are discussed.

## Literature Review

### *Drive tourism*

Drive tourism may be defined as “tourism that centres on travelling from an origin point to a destination by car that is either privately owned or rented, and engaging in tourism related activities during the journey” (Prideaux and Carson, 2003, p. 308). In the U.S., private automobiles are the preferred mode of travel among as many as 80% to 85% of vacationers (LaMondia et al., 2008); of these travelers roughly one-third is long-distance domestic leisure travel (LaMondia et al., 2008). The Bureau of Transportation Statistics likewise estimated that an average 90% of all annual holiday travel is undertaken by personal vehicle (U.S. Holiday Travel, no date).

Limited research on domestic drive tourism, however, has been conducted (Meng and Hudson, 2016). Prior studies include two that focused on drive tourism in a rural context (Meng and Hudson, 2016; Yi et al., 2011). One study emphasized the pros and cons of tourism development in rural areas, a predominantly drive tourism market. The article noted such benefits as economic revitalization and development, such drawbacks as increased pollution and congestion, and a range of potential social impacts both positive and negative (Yi et al., 2011). A second study considered constraints and barriers as well as behavioral intentions to visit a rural ‘stopover’ *en route* (Meng and Hudson, 2016). Findings highlighted the influence of a destination’s affective image as well as individual constraints such as time and budgetary considerations (Meng and Hudson, 2016). The study concluded that drive tourism, though ubiquitous, is not necessarily an easily penetrated market from the attraction or business point of view (Meng and Hudson, 2016). A third study took environmental impacts of drive tourism into account. Fjelstul and Fyall (2015) considered the emergence of clean energy and its potential benefits in the context of drive tourism. The study advocated actively wide spread adoption of cleaner energy vehicles so that road travel becomes an environmentally sustainable as well as fun and flexible form of travel (Fjelstul and Fyall, 2015).

To explore intention to download a gamified travel app, the current study adapted a model based on Theory of Planned Behavior (TPB). TPB has been used extensively in tourism research to explain and predict behaviors. TPB studies in tourism have included a diverse range of topics, from festival revisit intention (Choo, Ahn and

Petrick, 2016), to pro-environmental decision-making in a hotel context (Olya, Bagheri and Tümer, 2019), or engagement in emerging tourism trends (Han, Meng and Kim, 2017).

A number of tourism studies have likewise adapted the TPB model to include precursors that are case specific. Fishbein and Ajzen’s (2010) themselves suggested that modifications to constructs stipulated in theory may enhance the TPB model’s predictive ability. One study, for example, considered past experience and destination image on tourists’ behavioral intentions in the context of recommending a destination (Rodríguez Molina, Frías-Jamilena and Castañeda-García, 2013). In this study, precursors to the outcome variable included cognitive, affective, and overall image as well as overall satisfaction with past experience as a moderating influence (Rodríguez Molina, Frías-Jamilena and Castañeda-García, 2013). In a more recent study, behavioral intentions with regard to hotels stays, recommendations, and revisit intention were considered (Padlee, Cheong and Zulkiffli, 2019). Precursors to these outcome variables included employee behavior, room amenities, physical evidence, and food quality, which were all mediated by customer satisfaction (Padlee, Cheong and Zulkiffli, 2019).

In terms of the model used in the current study, the role of gaming motivations, time and frequency of usage as mediators as precursors to intention to download were considered. Despite the great potential for gamification in the tourism industry, research studying the impact of gamification on traveler’s intention to download and use among driving tourism is lacking. Furthermore, gamification effects are greatly dependent on how it is implemented (Hamari et al., 2014), and thus it is important that there is a specific gamification context to provide reliable results in traveler’s experiences and behavior with technology (Sigala, 2013). To address this gap, this paper is positioning the role of gamification in the tourism industry and more specifically within the larger context of drive tourism.

## Conceptual Framework and Hypotheses Development

### *Travel apps and Intention to Download*

Travel apps are mobile apps targeted to the needs of travelers (e.g. Airbnb, Tripadvisor, Skyscanner) or used within tourism contexts (e.g. Google map, Imoney, Instagram) (Dickinson et al., 2014), and have proliferated within the travel industry. Overall, travel apps ranked seventh in terms of popular downloads (Kennedy-Eden and Gretzel, 2012) while their collective impact has transformed the industry with greater impacts anticipated (Dickinson et al., 2014; MacKay and Vogt, 2012; US Department of Transportation, 2016). According to Pew Study data, 74% of adults use smartphone apps for purposes of navigation, to check road and weather conditions, and for real-time congestion and parking updates (US Department of Transportation, 2016). Uses of apps *in situ* are also increasingly common (MacKay and Vogt, 2012). These include check-ins and tagging (Gana and Thomas, 2016), and navigation within destinations via, for example, mobile tour guides (Lai, 2013).

Besides *in situ* uses, other tourism research may be divided into two broad streams, namely usage categorization and download intention. A taxonomy of travel app uses, for example, was provided by Kennedy-Eden and Gretzel (2012) as follows: (1) navigation, (2) social, (3) marketing, (4) security/emergency, (5) transactional, (6) information and (7) entertainment functions. Based on UK visitor information, Dickinson et al. (2014) devised a similar schema that included: (1) access to information and information related searches (e.g. maps, timetables and attraction descriptions); (2) two-way information sharing, either voluntary, such as Facebook and other social media platforms, or involuntary such as data mining by service providers; (3) context awareness such as weather or attraction related

travel alerts; and (4) the internet of things or hyper-connectivity between people and things and the related ability to communicate information (e.g. real-time train or bus schedule updates) (Dickinson et al., 2014).

Download intention, or an individual's willingness to use a specific travel app, has been the focus of other studies. According to one study, the initial success as well as survival of an app may be enhanced by increased offerings across multiple categories (e.g. navigation, travel, lifestyle, games, weather and/or education) (Lee and Raghu, 2014). Another study on mobile tour guide app acceptance found the most significant precursors to behavioral intention was informativeness, or the perceived ability of the app to make information readily available (Lai, 2015). Informativeness also had a significant impact both on performance expectancy and behavioral intention (Lai, 2015). In the same study, a second theoretical antecedent, entertainment, defined in terms of an activity that is perceived to be enjoyable, pleasing and fun, had a very significant impact on performance and effort expectancy, but no direct influence on behavioral intention (Lai, 2015).

Another, recent study integrated psychological constructs with the unified theory of acceptance and use of technology model to consider consumers' intentions to adopt mobile apps for the purposes of making tourism related purchases (Tan et al., 2017). Study findings indicated that, among others, effort expectancy (ease of use), facilitating conditions (technical and commercial app support), and perceived playfulness were significant predictors of intention to use mobile apps in a tourism context (Tan et al., 2017).

**H1:** Existing usage of a travel app has a positive impact on tourists' intention to download a gamified travel app

#### ***Gamification, Time and Frequency of Usage as Mediators***

Gamification within the tourism industry is still considered to be in its infancy (Xu, 2016). Also, gamification of travel apps in particular has not, to the authors' knowledge, been considered in prior research studies. On the other hand, gaming via mobile apps has already been used to market destinations, encourage brand awareness and engagement, provide information in interactive ways, and enhance site-specific experiences (Xu et al., 2016). One study on tourists as mobile gamers further demonstrated that utilitarian and hedonic functions overlap rather than serve distinct purposes (Xu et al., 2016). Study respondents, for example, reported that information gathering about a destination, a utilitarian function, would be enhanced through game play and preferred over traditional sources of information gathering such as travel books or the internet (Xu et al., 2016). Participants further reported that game play was favored pre and post trip as well as in transit (Xu et al., 2016).

In terms of download intention, one study demonstrated that it was influenced by a combination of user related and technical considerations, that is particular features of the app itself (Yuan and Chih, 2016). The mediating effects of consumer traits has further been demonstrated in prior studies (Dinsmore, Swani, and Dugan, 2017). The attractiveness of gamification features has also been shown to be dependent on consumers' existing game use regardless of whether this gaming was habitual or undertaken across different platforms (Hofacker et al., 2016). Finally, in addition to practical considerations such as cost, anticipated frequency of use was found to be a significant precursor to download intention (Yuan and Chih, 2016).

**H2:** Gaming motivations mediate the relationship between existing usage of an app and traveler's intention to download the app

**H3:** Time spent on games mediates the relationship between gaming motivation and existing usage of a travel app

**H4:** Frequency of app usage mediates the relationship between gaming motivation and existing usage of travel app

#### **Method**

A professional research company, qSample was used to distribute an online survey to a panel in April 2017. As intention to use a travel app is different for existing versus potential users (Hsu and Lin, 2015), and the adoption of travel apps is ubiquitous among drivers already (US Department of Transportation, 2016), the current study focused on gaming as a motivation among existing app users. Specifically, the survey targeted U.S. residents who answered three screening questions affirmatively: (1) Do you own a smartphone? (2) Do you take road trips (engage in leisure travel by car)? (3) Do you use travel apps? After screening for eligible responses, 238 online surveys were completed and deemed usable.

#### ***Measurement development***

Travel app functions or usages were derived from a taxonomy identified by Kennedy-Eden and Gretzel (2012). These include social purposes (e.g. social networks, communication), marketing alerts (e.g. contests, discounts), transactional purposes (e.g. hotel reservations, payment), security/emergencies (e.g. medical, roadside assistance), travel information (e.g. weather, traffic, nearby amenities), and entertainment (e.g. music, games, videos).

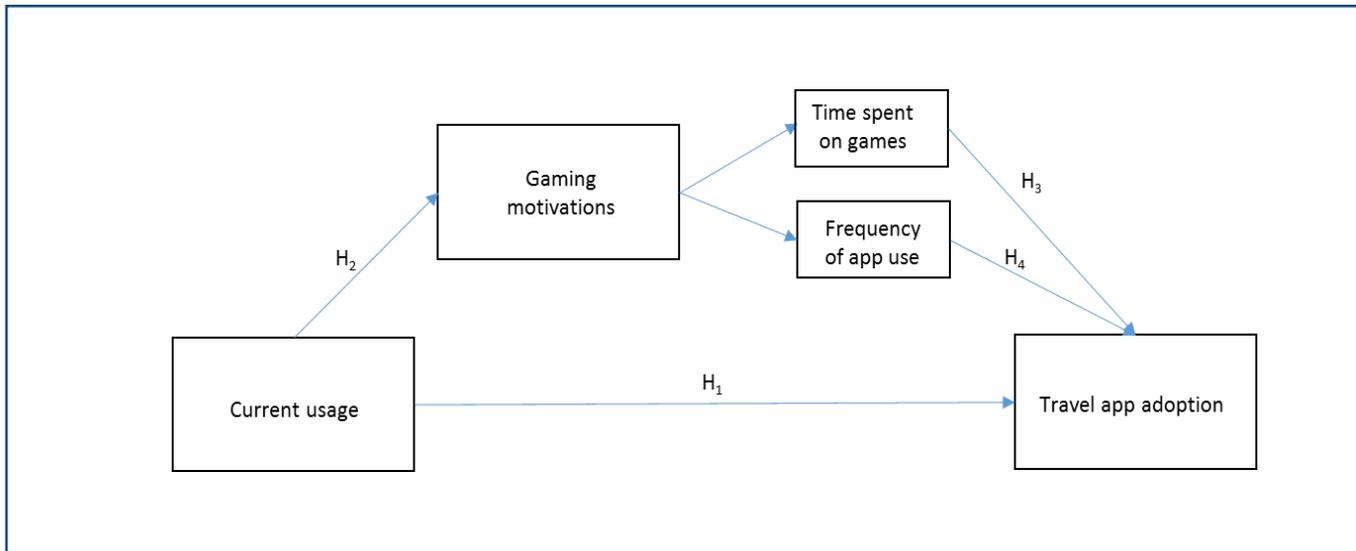
Current app users were the focus of the current study as they are already in the vast majority. According to recent research, the market reach of travel apps among mobile users now exceeds 85% (Clement, 2019b). Existing users were of further interest to control for barriers to adoption, such cognitive or economic constraints (Bouwman et al., 2007), or those implied by the Technology Acceptance Model (Kim, Park and Morrison, 2008).

Motivations for gaming identified in a prior study were adapted for use in the current study (Yang and Liu, 2017) as a mediating factor. Of the seven items identified, six were used as the motive 'Exercise' was not relevant in a drive tourism context. The other six, were (1) Fun (e.g. If it encouraged fun with passengers in the car), (2) Escapism (e.g. If it used augmented reality to populate the landscape with fantasy figures that I could find and 'capture'), (3) Nostalgia, (4) Relationship maintenance, (5) Relationship Initiation, and (6) Achievement.

Time spent both on games as well as travel app usage were included as additional, potential mediating factors. In the first instance, the assumption was that the degree to which gaming features would influence adoption or conversion to a gamified travel app would be influenced by initial interest or engagement in game play. In the second instance, the assumption was that a greater reliance on travel app usage may likewise mediate an interest in travel app adoption or conversion overall.

Travel app usage was measured according to particular functions (social purposes, marketing alerts, transactional purposes, security/emergencies, travel information, and entertainment) as previously identified (Kennedy-Eden and Gretzel, 2012). We measured travel app functions with six items (Cronbach alpha= .83),

**Figure 1** Conceptual Framework



motivation with 9-items (Cronbach alpha=.94) and intention to adopt (i.e. If a travel app combined functional features (e.g. way-finding) with voice activated gaming features, what might motivate you to download it?) with 3-items (Cronbach alpha=.92. All measurements were based on a 5-point Likert Scale (1=Strongly Disagree; 5= Strongly Agree) (see Table 1). Three items measured intention to download (e.g. In the future, I would download a travel app with mobile gaming features) based on the Theory of Planned Behavior (Ajzen, 1991).

## Results

### Preliminary data analysis

Subjects were asked to respond to various statements that assessed their current use of travel apps on road trips. Respondents ranged in age from 17-65. The mean age was 45. Prior to estimating the structural model, an exploratory factor analysis (EFA) with oblique rotation was conducted to test for potential measurement problems. The result of the EFA supported the scales' uni-dimensionality and reliability. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy verified the sampling adequacy for the sample; the KMO result was far above Kaiser's (1974) minimum threshold of 0.5. The communalities after extraction were all greater than the 0.50 threshold of average community required by Kaiser's criterion. Bartlett's test of sphericity  $X^2(253) = 4370.26$ ,  $p < .001$ , indicated that the correlations between the items were sufficiently large for the EFA's principle component analysis (PCA). The PCA generated theoretically meaningful components because each item loaded precisely onto its proposed latent construct without any cross-loadings. All factor loadings were satisfactory, reporting absolute values that ranged from 0.51 to 0.87.

We developed the measurement model consisting of one exogenous and two endogenous constructs, and conducted confirmatory factor analysis on multiple scales (i.e. functions using an app, motivation, intention to download the app). Cronbach's Alpha evaluated scales' internal consistency. All measures demonstrated reliability with alpha values of .80 and greater. A

Confirmatory Factor Analysis (CFA) was conducted to test the overall validity of the measurement model. The CFA results were obtained through AMOS 21 software which showed a good model fit for a 23-item model, with  $\chi^2 = 406.68$ ,  $df = 219$ ,  $p = .00$ ; CFI = .96; RMSEA = .06; NFI = .91; TLI = .95.

To assess the convergent validity of the measurements, Fornell and Larcker (1981) proposed examining three metrics: the item reliability of each measure; the composite reliability of each construct; and the average variance extracted for each construct. The item reliability of each measure was assessed by performing a principle components factor analysis (PCA). A construct is considered to exhibit satisfactory convergent and discriminant validity when items load highly on their related factor and have low loadings on unrelated factors. Factor loadings of the indicators for each construct were statistically significant and sufficiently high to demonstrate that the indicators and their underlying constructs were acceptable (see Table 2). The reliabilities and variance extracted for each latent variable revealed that the measurement model was reliable and valid (see Table 3). Computed using indicator standardized factor loadings and measurement errors (Hair et al., 2006), the average variance extracted (AVE) ranged from 0.72 to 0.95 (see Table 1).

All of the standardized loadings were above 0.50 ( $p < .001$ ), demonstrating indicator reliability (see Table 1). Similarly, the model constructs attained high Cronbach's alpha and composite reliability values that were greater than 0.80, implying internal consistency. All of the constructs exhibited discriminant validity (see Table 3).

### Overall model fit

Result of structural equation modeling obtained for the theoretical model revealed a  $\chi^2$  of Model Fit Indices:  $\chi^2$  of 23-item model, with  $\chi^2 = 411.11$ ,  $df = 221$ ,  $p = .00$ ; CFI = .96; RMSEA = .06; NFI = .91; TLI = .95. All relationships proposed by the theoretical model were significant (see Table 4). Hypothesis 1 (H<sub>1</sub>) predicting that current

**Table 1 Measurement items, Reliability**

		Coefficient Alpha	CR*	AVE**
USAGE 1	For social purposes (e.g. social networks, communication).	.94	.88	.54
USAGE2	For marketing alerts (e.g. contests, discounts).			
USAGE3	For transactional purposes (e.g. hotel reservations, payment).			
USAGE 4	For security/emergencies (e.g. medical, roadside assistance).			
USAGE5	For travel information (e.g. weather, traffic, nearby amenities)			
USAGE6	For entertainment (e.g. music, games, videos)			
MOTIVATE1	If gaming features let me interact with other drivers along the route	.95	.95	.68
MOTIVATE2	If gaming features let me interact with other travelers at designated stops on route			
MOTIVATE3	If it used augmented reality to populate the landscape with fantasy figures that I could find and 'capture'			
MOTIVATE4	If it had fantasy quests to complete at designated stops			
MOTIVATE5	If it used themed (e.g. top secret mission) route information with challenges at designated stops			
MOTIVATE6	If it included movie or gaming characters from my youth/childhood			
MOTIVATE7	If it included characters that I identify with personally			
MOTIVATE8	If I could 'win' my route through dominating challenges			
MOTIVATE9	If I could rank on a leader board for beating the game			
INTENT1	I would like a travel app with mobile gaming features	.92	.95	.86
INTENT2	I would utilize a travel app with gaming features			
INTENT3	I would recommend a travel app with gaming features to my friends and family			

Usage: Current uses; Motivate: motivation to use; INTENT: Intention to use

\*CR: Composite Reliability refers to composite reliability is less biased estimate of reliability than Cronbach Alpha.

\*\*AVE: average variance extracted measures the level of variance captured by a construct versus the level due to measurement error.

**Table 2 Standard Factor Loading Estimates**

	USAGE	MOTIVATE	INTENT
USAGE1	0.72		
USAGE2	0.77		
USAGE3	0.76		
USAGE 4	0.68		
USAGE5	0.71		
USAGE6	0.77		
MOTIVATE1		0.79	
MOTIVATE2		0.87	
MOTIVATE3		0.85	
MOTIVATE4		0.80	
MOTIVATE5		0.77	
MOTIVATE6		0.86	
MOTIVATE7		0.85	
MOTIVATE8		0.81	
MOTIVATE9		0.81	
INTENT1			0.93
INTENT2			0.93
INTENT3			0.92

**Table 3** Inter-Construct Correlations and the Square Root of AVE (Fornell-Larcker Criterion)

	Intent	Motivate	USAGE
Intent	0.927		
Motivate	0.737	0.825	
USAGE	0.493	0.580	0.735

On a scale of “1” Strongly disagree; “5” Strongly agree

**Table 4** Path Coefficient and Hypotheses

Hypothesis	Path Coefficient	t-value	Supported?
Hypothesis 1      USAGE→ Intention to use	.38***	4.16	Yes

<.10\*, <.05\*\*, <.01\*\*\*

usage of a travel app has a positive relationship with motivation to use a gamified travel app ( $\beta = .34, p < .01$ ) was supported. The second hypothesis (H<sub>2</sub>) which predicted that gaming motivations have a positive impact on intention and mediate the relationship between current usage and intention to download a gaming travel app, was also supported ( $\beta = .73, p < .01$ ).

**Mediation Findings**

For mediation, Mathieu and Taylor’s (2006) bootstrap method was used. We used 2,000 bias-corrected (BC) bootstrapping samples at the 95 BC confidence level to determine the chain mediation effects.

Intention to use was found to be mediated by motivation in a single construct configuration. To achieve complete mediation, direct effects of the independent variable on the dependent variable must be significant; however, significance is eliminated in the presence of mediators. This indicates that the independent variable influences the dependent variable through mediators. On the other hand, to observe partial mediation, direct effects of the independent variable on the dependent variable must be significant and this significance is not eliminated in the presence of mediators. The mediated results are summarized in Table 5.

**Table 5** Hypotheses Summary and Mediation Results

Hypothesis	Mediation	Evidence	Mediation	
			$\beta$ and p value	
2	USAGE → motivation → intention to download	X→M1 M1→Y X→Y	.73*** .65*** .07 <i>n.s.</i>	Full mediation
3	Motivation →time spent on game→ intention to download	X→M1 M1→Y X→Y	.08*** .39*** .23***	Partial Mediation
4	Motivation →frequency of travel app usage→ intention to download	X→M1 M1→Y X→Y	.08*** .13 <i>n.s.</i> .25***	No mediation

X- Independent variable (USAGE); M1- mediator (motivation; time spent on game; frequency of travel app usage); Y- Dependent variable (intention to use)

Frequency of travel app usage did not have a mediating effect on the relationship between motivation and intention to download a travel app. However, time spent playing games on a mobile device did have a mediating effect on the relationship between motivation and intention to download.

### Discussion and Implications

The objective of this study was to determine if gaming motivations mediated the relationship between existing travel apps use and intention to adopt a gamified travel app among drive tourists. This intersection was of interest given the saturated nature of the travel app market; in other words the need to develop value added features (such as gaming) to encourage app conversion or adoption. The current research also fills a gap in the literature on travel app usage among tourists (Lu et al., 2015), especially in the context of a drive tourism market that is likewise under-researched (Yi, Day and Cai, 2011).

The present study indicated that while existing travel app users are likely to adopt a gamified travel app, gaming motivations mediated the relationship between travel app users and intention to adopt a gamified travel app. For app developers, this suggests that a gamified travel app would appeal to gamers in particular but not necessarily to drive tourists as a group. This conclusion was supported by the finding that while level of engagement with games increased the likelihood of adoption of a gamified travel app, increased usage of a travel app did not. As such, a gamified travel app may be considered a niche item and should be developed and targeted to a specific audience rather than for mass appeal.

In terms of travel app usage, hedonic features may nonetheless increase enjoyment overall as noted previously: “if a person can gain social recognition from their peers by using a mobile app, their level of enjoyment would be enhanced, ultimately leading to a higher level of usefulness and favorable attitude towards using travel mobile apps” (Im and Hancer, 2016, p. 13). It may also increase customer value, loyalty, and engagement as noted in other contexts (Hofacker et al., 2016).

As mobile apps become the interface between tourists’ commercial and touristic environments to an increasing extent, their role in not only facilitating but shaping travel behaviors is highlighted (Dickinson et al., 2014; MacKay and Vogt, 2012). In a drive tourism context, a gamified travel app may offer marketing benefits in the form of influencing drive tourists *ad hoc* decision making (Dickinson et al., 2014). As unplanned stops are a substantial part of drive tourism (Hwang and Fesemaier, 2011), and drive tourists are inherently hyper-mobile (Dickinson et al., 2014), this market segment may be induced to make dynamic travel decisions through game play. The Pokémon Go app, for example, has already demonstrated the extent to which a combination of gaming and navigational functions can influence users’ spatial movements (Rauschnabel, Rossmann and Dieck, 2017).

The current study confirmed that hedonic motivations are compatible with utilitarian functions in a drive tourism context. This builds on the findings of Im and Hancer (2016) who demonstrated that hedonic and utilitarian functions were both important in shaping attitudes towards app usage among travelers. A key finding of Im and Hancer’s (2016) was that while utilitarian functions were the more important, hedonic motivations played a role, “as an important catalyst for utilitarian motivations” with respect to mobile app usage (p. 177). In other words, the two functions were complimentary rather than distinct. In the current study, this was demonstrated where utilitarian (marketing alerts, transactional purposes,

security/emergencies, travel information) and hedonic (entertainment, social) functions both loaded on a single factor (see Table 1) with the highest factor loadings being Transactional (.77) and Entertainment (.77), in other words, utilitarian and hedonic functions respectively. Factors that enhance enjoyment and usage are, again, especially relevant given the saturated nature the travel app market (US Department of Transportation, 2016). As a first step towards understanding how travel app functions may be enhanced to appeal to existing and potential users, the present study thus confirmed prior research on app usage among travelers which suggested that app enjoyment enhances utilitarian functions and positively impact travelers’ attitudes towards using a particular app (Im and Hancer, 2016).

Finally, mobile gaming apps is the fastest growing segment within the gaming market, a market that already generates billions of dollars annually (Weber, 2014). In addition, app designers are already engaging consumers through gamification or an enhanced sense of play within the travel and tourism industry (Weber, 2014). A gamified travel app may capitalize on these market trends as well as align with overall trends in the hospitality and tourism industries toward more experiential products and services (Weber, 2014; Yang and Liu, 2017).

### Limitation and future directions

There are a few limitations and opportunities for future research. First, the generalizability of our findings may be limited given that this study investigates a wide age range of app users for the research context. Future research may consider streamline the research toward a more relevant age group (e.g. millennials or Gen Z) as well as gamers in particular. Future research may consider extending our findings in other contexts of gamified travel apps. However, care should be noted for the influence of different platforms (e.g. Android versus iOS), cultural backgrounds, and control variables.

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