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A business model adoption based on tourism innovation: Applying a gratification theory to mobile applications

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ABSTRACT

The purpose of this paper is to improve understanding of Tourism Innovation by using a Uses and Gratification Theory model to investigate tourist intention to visit a city after reading other users' valuations of the destination on Mobile Applications.

The Uses and Gratification Theory (U&G) model was adapted to investigate the factors which influence tourist intention to visit a city. Satisfaction and Tourism Experience were added as external variables to the U&G model. The original Convenience construct for mobile tourism applications was changed to Mobile Convenience for this study.

A survey was carried out to investigate the factors which influence tourist intention to visit a City. 261 users with different nationalities were asked about their experiences and feelings when using Runnin'City, which was the mobile tourism application used in this study. The results were analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM). All the relationships of U&G were supported, except for Information for Tourism Experience.

Self-Expression was found to be especially relevant and was moderated by Entertainment, Information and Mobile Convenience which in turn influence Satisfaction, Tourism Experience and Intention to visit a City.

The Gender and Running frequency variables were also investigated using multi-group analysis. The influence of Mobile Convenience on Satisfaction was seen to be moderated by Gender, and the relationships of Information and Entertainment on satisfaction are moderated by Running Frequency.

The results obtained with the proposed changes in the U&G model will be very useful for academics and also for designers and developers of mobile tourism apps as they show the special role played by Self-Expression and Entertainment as relevant factors for the success of a mobile tourism app.

1. Introduction

The tourism industry has been affected by new advances in Information and Communication Technologies (ICTs) over the last few years. The Internet has had an especially strong effect on the changes which have taken place in the tourism industry with the use of connected devices and the new customer acquisition strategies (Gretzel, Sigala, Xiang & Koo, 2015). Technological development has promoted that tourism is now perceived as a product rather than a service (Matos, Mendes & Valle, 2012).

The use of these strategies in the digital environment is known as digital marketing and is used to improve recruitment, loyalty and sales with the Internet. Nowadays, electronic devices with an Internet connection are continually being used to organize and help people with their travels around the world by using different applications such as travel guides, GPS, or interactive history books (Saura, 2020).

A new business model that is being used in the tourism sector is the installation of mobile applications in smartphones. These provide tourism services and also incorporate management, creativity, productivity or games. These mobile applications are designed to provide the user with tourism services their trip and also when travelling in the future.

The increase in Internet use when travelling and taking part in tourist activities has increased innovation in this sector with the emergence of new business models that are increasingly innovative and are aimed at providing the users with added value on their trips.

GPS allows geolocation, which is the ability of a device to process information to determine its geographical position. From a

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commercial point of view, they are known as Location Based Services (LBS). A typical LBS consists of location-based announcements, emergency evacuation and services social networks (Zhou, 2011).

One of the formulas that is currently being used in these new business models is geolocation technology which can accurately identify where a user is when using an application. In this way personalized information, which changes depending on the user's position, can be offered to the user on their Internet connected device (Moscardo, 2008). In the tourism field, the adoption of the LBS depends on the social and environmental benefits obtained by the downloaded app (Palos-Sanchez, Hernandez-Mogollon & Campon-Cerro, 2017).

In addition, there are many other new applications and a variety of innovative business models, which use different strategies to help users perform day to day tasks and other activities, such as tourism. An example of an innovative strategy is one that uses the user's profile to generate a role which can be used in a game with different milestones that have to be reached in order to win a prize or a reward.

This type of business models uses the concept of gratification. Gratification is a strategy that requires users to achieve different milestones in a mobile application. In order to receive a better prize at the end of a series of milestones, users must share their achievements on social networks (Brooker & Joppe, 2014).

In an increasingly connected ecosystem in which users are connected to the Internet for an average of 10 h a week, sharing information with the users' contacts is becoming increasingly important.

Nowadays, many users of tourism applications want to share the experiences (milestones) they have had (achieved) with their user community by publishing them on social networks so that their followers can see their success with the application (Tajeddini, Ratten & Denisa, 2017).

This means that users of these tourism applications have social influence and interact with their social network followers for entertainment by sharing their achievements (Rodríguez, Williams & Hall, 2014).

There has been a real increase in the use of these technologies in the tourism sector, as indicated by (Palos-Sanchez, Saura, & Correia, 2021). This increase has been exponential, mainly due to the improvements in new technologies in the tourism sector (Paget, Dimanche & Mounet, 2010).

The goal of this research is to investigate the business models in the tourism sector that use this type of personal gratification strategy where users share their tourism activities and experiences using mobile applications.

This study uses Runnin'City, which is a smartphone application in the tourism sector with which users do sport whilst visiting a city (Tsiotsou & Ratten, 2010). This application allows users to listen to information about the touristic monuments in a city whilst jogging through it. This application was chosen because it proposes a new way of visiting a city and promotes healthy habits with little environmental impact.

The study investigates the Uses and Gratification Theory (U&G) which is used in the Runnin'City application. The aim is to find the reasons why users publish their experiences on digital platforms by studying the publications that users share using the Runnin'City application. The motivation that the user has when sharing information about their achievements on smartphone applications can then be identified.

This investigation covers an existing gap in the present literature because it studied an application with a business model which is innovative and combines the positive aspects of sports with the satisfaction and mental gratification that users feel when they share information on social networks. Other research has commented on models of gratification in tourism applications, but here it is the main focus of this research.

This study is organized as follows. First, there is an introduction and literature review, in which innovation in the tourism sector is explained. Then, the methodology and hypotheses used in the study are presented. The results of the research are presented and analysed and finally, the conclusions and discussion are given.

2. Literature review

2.1. Smartphone applications in the tourism sector

Tourism is an important part of the economy as international tourism generated 1.5 trillion USD in 2015. Tourism is also essential for employment and sustainability around the world, as one in every eleven jobs is connected with the tourism sector (Garsous, Corderi, Velasco, & Colombo, 2017). The evolution of technology and communications since the 1980s has led to dramatic changes in the tourism industry and have allowed global interaction between the parties involved in tourism services. Social networks and other emergent forms of online communications are having enormous impact on travel planning, especially with smartphones that allow access to information from anywhere in the world and this is producing a radical change in the behavior of travellers (Xiang, Magnini & Fesenmaier, 2015). The smartphone market has increased exponentially throughout the world in the last decade (Reyes-Menendez, Saura & Stephen, 2020). This is an important fact as smartphones are the devices which mobile application work on. The number of tourism applications downloaded by smartphone users has been steadily increasing over the last few years.

There are many categories of mobile tourism applications which can be grouped depending on when they are used during a trip. Some applications give an initial idea about the destination (Hoyer & MacInnis, 2001) while others give information about interesting places or improve the user experience at the destination. (Pantelidis, 2010; Verma, Stock, & McCarthy, 2012). In the second case, the applications which are used the most are those that provide real time information about services available at the location such as accommodation, transport, restaurants and other leisure activities (Okazaki, Díaz-Martín, Rozano, & Menéndez-Benito, 2015; Ardissono, Kuflik, & Petrelli, 2012; Thakran & Verma, 2013).

The information about these services is usually treated as an accessory which is continually available during a trip. Searches for information about local transport service are becoming increasingly popular (Verma, Stock, & McCarthy, 2012). (Liang, Schuckert, Law, & Masiero, 2017) analysed the trends of different types of tourism applications for smartphones.

Other applications in the tourism sector focus deal with the user experience during the trip. García-Magariño, Palacios-Navarro and Lacuesta (2017) proposed the use of tourism applications on smartphones as a way of improving the decisions made by the agents involved. Other research into tourism applications has studied tools for the promotion of destinations, heritage sites and sustainable development. Applications that use geolocation to add value to the user experience during trips have also been investigated (Hardy et al., 2017).

Other characteristics studied was personalization, which gives the opportunity to choose the information shown to them and to access only what they think is most relevant to them and to the selected destination. These features, if correctly studied, can provide app users with destination experiences to enhance their travelling enjoyment (Palos-Sanchez, Saura & Correia, 2020).

2.2. Similar studies

Innovation in the tourism sector is an area which researchers have been investigating over the last decade (Hall & Gössling, 2013; Hjalager, 2010). The gratification models used by mobile tourism

Table 1
Similar studies.

Authors	Description
Huang (2008)	Uses a model including entertainment and gratification to find the positive impact on the perceived use of applications
Mantymaki and riemer (2014)	Use a gratification and entertainment model to show that an application will continue to be used when there is a positive relationship between engagement and user' interactions.
Bilgihan et al. (2016)	The study shows that the feelings of satisfaction, gratification and social acceptance are generated when tourists share their experiences on social networks.
Raacke and BondsRaacke (2008)	This study suggests that the information that users share on social networks influences the way followers interact and therefore also influences the interaction and the gratification users feel when sharing content

applications was investigated by (Corrocher, 2011) who studied the use of this type of application and the factors that affect the amount of user interaction.

Lampe et al. (2006) investigated the characteristics that users consider important when selecting applications that can be installed in Internet browsers. (Raacke & Bonds-Raacke, 2008) identified the social interactions of users when sharing information on social networks and investigated the user satisfaction when sharing content.

Joinson (2008) used gratification models to investigate the user gratification when using the Facebook application. (Xiang & Gretzel, 2010) tourism innovation and how social networks can be used to promote tourism.

(Bilgihan, Barreda, Okumus, & Nusair, 2016) also showed the amount of user satisfaction when content is shared on social networks, and how this satisfaction made users happier and psychologically stable. Table 1 shows similar research which used gratification and satisfaction models for innovative smartphone applications in the tourism sector.

3. Methodology and hypothesis development

3.1. Uses and gratification theory (U&G)

The Uses and Gratification Theory (U&G) model (Katz, Blumler & Gurevitch, 1973; Rauschnabel, Rossmann, & Dieck, 2017) was used in this research. This model was used to find out what motivates users to share content on different application which give rewards.

The model studied the social and psychological characteristics of users who are motivated and feel satisfied when using mobile tourism applications that include games. The model has three main constructs, which are Motivation, Behavioural Use and Gratification/ Satisfaction. In this case, Motivation refers to the characteristics which positively influence a user's actions. Behavioural Use refers to the usage patterns when sharing communications on social media. These patterns include the exposure time, type of use, and the information that is shared on the platform.

U&G is a model which can be applied to all types of communication channels and media, which may also include games and milestone achievements with short-term goals for gratification and satisfaction.

A group of new constructs were added to the model following the research by Ho and See-To (2018) and Choi, Fowler, Goh and Yuan (2016). Information (INF) is the type of information a user shares on social networks. Entertainment (ENT) measures how

entertained a user feels with the gratification model used in the application. Self-Expression (SE) is how free a user feels to share their true opinions and experiences about a trip or destination. Social Influence (SI) is the way in which other users of the application influence the content shared and how their opinions can influence the gratification of the user. The Tourism Experience (TOUE) is a factor which measures how a user feels about their tourism experience with the use of the mobile application and its gratification model. Mobile Convenience (MOC) measures how convenient a user feels it is to use the application when at a tourist destination. The last construct added to the model was Visit Intention for the city (VIC) which shows the intention that a user has to visit a city with the application.

3.2. Proposed hypotheses

Ha, Kim, Libaque-Saenz, Chang and Park (2015) found a relationship between Self-Expression (SE) on social media and the Convenience (CON) of using mobile tourism applications to share information. This means that the user valuation of Self-Expression for the tourism application can the value a user gives for the Mobile Convenience of using an application whilst on tourist trips and excursions. This relationship was also confirmed by Malik, Dhir and Nieminen (2016), thus showing evidence of the relationship between Self-Expression and Mobile Convenience when researching digital media content. Therefore, the following hypothesis was proposed:

H1: User Self-Expression (SE) when using a tourism application influences Mobile Convenience (MOC) when on tourist trips

Smock (Smock, Ellison, Lampe, & Wohn, 2011) and Malik et al. (2016) found that the value given to Self-Expression by users of tourism applications increased the amount of information available to users of these applications and digital platforms. In addition, variations were seen the tone and expressions made by users of the application when on their trip. This may influence how users behave when traveling and using their apps. The following hypothesis was therefore proposed:

H2: The Self-Expression (SE) of tourists who use mobile tourism applications influences the type and amount of information (INF) shared during their travels.

Chang and Thorson (Chang & Thorson, 2004) showed the influence of Self-Expression on travelers using applications and web pages and how entertained they feel whilst doing this on their trips abroad. There is therefore a relationship between the communication that is made using mobile tourism applications and the *entertainment* felt by the users of these applications. Chang and Thorson (2004) also confirmed in their findings that the more entertained users feel, the higher the possibility that they increase using a tourism application at their destinations. The following hypothesis was therefore proposed:

H3: Self-Expression (SE) of tourists using mobile tourism applications has an influence on the Entertainment (ENT) felt by the tourist

Ha et al. (2015) investigated the relationship between Mobile Convenience (MOC), which is the ease and comfort of sharing content on tourism websites, and the satisfaction users felt when sharing their experiences. This relationship was also included in the research by Choi et al. (2016) to find how the Mobile Convenience of using tourism applications influences Satisfaction. The following hypothesis was therefore proposed:

H4: The Mobile Convenience (MOC) of mobile tourism applications positively influences the Satisfaction (ST) with the trip

Ha et al. (2015) used a gratification model to study the attitudes and behavior of users while travelling. The positive influence of the convenience of using mobile tourism applications on the travellers' experience was proposed. A positive experience provoked a feeling of satisfaction with the trip. These relationships were also justified in the findings of Ha et al. (2015) and Malik et al. (2016). The following hypothesis was therefore proposed:

H5: Mobile Convenience (MOC) positively influences the Tourism Experience (TOUE) of the users of mobile tourism applications

Li, Liu, Xu, Heikkilä and Van Der Heijden (2015) found that the information and experiences that users share with mobile tourism applications and digital platforms while travelling positively influences how satisfied they feel with the trip (Ha et al., 2015). The use of mobile tourism applications could also influence the satisfaction that tourists feel about their tourism activities while using the tourism application at their destination. The following hypothesis was therefore proposed:

H6: The information (INF) shared by the user with a mobile tourism application has a positive influence on the users Satisfaction (ST) with the trip

Ducoffe (Ducoffe, 1995) and Li et al. (2015) showed the relationship which exists between the information which is available about the tourist destination and the user experience at the destination. Ha et al. (2015) and Choi et al. (2016) found a relationship between the information that is available on tourism websites with the experiences which users post about their trips (Ho & See-to, 2018). Therefore, the following hypothesis was proposed:

H7: The Information (INF) which users share with mobile tourism applications during their trip positively influences Tourism Experience (TOUE)

Smock (Smock, Ellison, Lampe, & Wohn, 2011) found that the information and experiences that users share with mobile tourism applications and digital platforms whilst travelling positively influences how satisfied they feel with the trip. This is also considered in the research by Choi et al. (2016) in which it can be seen that the use of tourist content and applications can influence the satisfaction of tourists at their destinations. The following hypothesis was therefore proposed:

H8: The information (INF) shared by the user on mobile tourism applications has a positive influence on user Satisfaction (ST) with the tourist trip

The research by Ducoffe (1995) found that entertainment with gratification was a key factor for satisfaction. In addition, Choi et al. (2016) showed that mobile tourism applications have a positive influence on users by linking entertainment with the satisfaction of using tourism applications for personal gratification. The following research hypothesis was therefore proposed:

H9: The entertainment (ENT) provided by mobile tourism applications positively influences Satisfaction (ST) when using this type of application during tourist trips

Ho and See-to (2018) identified the positive influence of user satisfaction with digital tourism platforms on the users' intention to visit a city for tourism purposes. The use of mobile tourism applications may then favor users wanting to visit a city while travelling. This relationship can therefore influence the attitudes of tourists when they want to visit a city (Smock, Ellison, Lampe, & Wohn, 2011). The following hypothesis was therefore proposed:

H10: Satisfaction (ST) with the use of mobile tourism applications positively influences Visit Intention for the City (VIC) when choosing a tourist destination

Ho and See-to (2018) identified the positive influence of publishing visitors' Tourism Experiences at a city with digital tourism platforms on the Visit Intention for a city. The use of mobile tourism applications may favor users wanting to visit a city. This was also seen in the research on tourism by authors such as Ha et al. (2015) and Smock (Smock, Ellison, Lampe, & Wohn, 2011). The following hypothesis was therefore proposed:

Fig. 1. Proposed Model.

Table 2
Sample Distribution.

Sample n = 261 Items (characteristics)	Frequency	Percentage (%)
Gender		
Male	118	45.21
Female	131	50.19
Others	12	4.60
Age		
18−30years old	169	64.75
31−45 years old	67	25.67
46−55 years old	17	6.52
56−65 years old	4	1.53
>65 years old	4	1.53
Highest education		
Diploma/advance diploma	10	3.83
Bachelor degree/profession qualification	51	19.54
University Students	40	15.33
Graduate University	160	61.30
Residence		
Town > 100.000 inhabitants	131	50.18
Town of 20.000 to 100.000 100.000 habitantes	72	27.59
Town of 5.000 to 20.000 habitantes	40	15.33
Town < 5.000 inhabitants	18	6.90
Job		
Student	158	60.54
Retired	4	1.53
Unemployed	7	3.45
Salaried worker	67	25.67
Self-employed)	23	8.81
Running frequency		
I don't run	4	1.53
1 or 2 days/week	194	74.33
3 to 5 days/week	42	16.09
Almost/Every day	21	8.05
Tourism frequency		
Never	7	2.68
1 to 3 times/year	177	67.82
4 to 6 times/year	53	20.30
> 6 times/year	24	9.20
Country		
Costa Rica	26	9.96
Spain	217	83.14
Others	18	6.90

H11: Publications about Tourism Experience (TOUE) with mobile tourism applications positively influence the Visit Intention for a City (VIC) when choosing a tourist destination.

The proposed theoretical model is shown in Figure 1.

3.3. Data collection

Data was collected with a self-administered web survey of smartphone users to test the proposed Uses and Gratification Theory (U&G) model,

The questionnaire was distributed using Google forms and the link was posted on public forums. The individuals who were surveyed were aged between 18 and 65 years old. An initial study collected data from a small group of Spanish RunninCity app users in the second half of November 2018 in order to check and correct the questionnaire and any confusion that it could inadvertently cause. Later, a non-probability convenience sample of smartphone users at different university departments at the University of Seville and University of Extremadura in Spain and the Technological Institute of Costa Rica was used to collect the research data (see table 2). All participants agreed to download and use the app before answering the questionnaire. They were offered an introductory video explaining the procedure for downloading installation and use. Most of the users were already users of the app, before they knew about this Research Project.

The survey was placed on a web site where participants could access and respond to the survey. After discarding the non-valid questionnaires, the final sample consisted of 261 users. College students have been included as part of the target population in past research on mobile applications (Bankole, Bankole & Brown, 2011; Hew, Lee, Ooi & Wei, 2015; Shorfuzzaman & Alhussein, 2016) and mobile use (Leong, Ooi, Chong & Lin, 2013; Zhou, Lu & Wang, 2010).

All the students in the survey used mobile sports applications and were used to using ICT. A large number of the students in the sample studied market research and collaborated as pollsters, passing questionnaires to others smartphone users. Therefore, a convenience sample was used because there were a lot of smartphone users and a large sample size could quickly be reached.

The final version of the questionnaire consisted of 27 items (see table 2 and appendix), for the ten constructs which were Information-INF (3 items), Entertainment-ENT (4 items), Self-Expression-SE (3 items), Satisfaction-ST (4 items), Visit Intention for the City-VIC (2 items), Mobile Convenience-MOC (2 items) and Tourism Experience-TOUE (2 items).

Various articles were reviewed in order to find the variables which should be measured for the constructs of the Uses and Gratification Theory (U&G). These were found to be the information shared and the users' attitude and motivation when using the technology, as explained by Ducoffe (Ducoffe, 1995) and Smock (Smock, Ellison, Lampe, & Wohn, 2011)

Chang and Thorson (Chang & Thorson, 2004) and Ha et al. (2015) used the Uses and Gratification Theory (U&G) to understand the gratification model and the constructs used in different projects.

Some of the original constructs of the model, such as CONS and SI, had to be discarded from the final model because they did not reach the minimum limit for validity in the analysis using PLS-SEM.

The problems that could be caused by the order of some of the questions was corrected by changing these questions at random.

The collected questionnaires were analyzed with descriptive statistical methods using PLS-SEM. PSL-SEM is a multivariate analysis technique which has become popular with researchers in recent years (Hair, Ringle & Sarstedt, 2011).

3.4. Pros and cons of this type of app

Runnin'City allows users to discover over 100 cities around the world while running or walking and guides the users through the main points of interest of a city, thanks to turn by turn, vocal GPS instructions and reads a 30 s description of the points of interest when you run past (Soares, 2019).

Among the advantages and disadvantages of running apps and, specifically, of the app analyzed are the following. This pro and cons are showed in table 3.

4. Analysis and results

PLS-SEM method was used to analyze the model proposed for this study. PLS is a method which is recommended for the study of the latent-constructs models formed by composites (Rigdon, 2016). It is mostly used to predict and explain relatively new phenomena (Chin & Newsted, 1999) and therefore can be seen to be applicable for the study of mobile tourism applications.

The PLS-SEM are analyzed in two stages (Chin, 1998; Cepeda-Carrion, Cegarra-Navarro, & Cillo, 2019). First, the reliability and validity of the measurement model must be confirmed and then a non-iterative application of ordinary least squares algorithm was made to obtain the loadings for the latent and the manifest variables of the relationships in the structural model. Second, bootstrapping

Table 3
Pro-and cons of RunninCity.

Runnin'City app	
Pro	Cons
This option is totally free, unless the user decides to install the paid version of the apps because they have some extra functionality that might interest the user. These apps are usually quite simple to use and, moreover, when using the mobile phone's GPS, they are usually more precise when calculating the route, allowing users to listen to music and share the results on social networks. It is compatible with the operating systems: Ios, Android and others.	It requires going out to run with the smartphone, so the user must have a place to take it, that does not bother him and that is safe for the device. There are bracelets in which the user can easily hook the phone and that allow him to listen to music with headphones. Users must be careful with possible falls of the smartphone and distractions from the runner. In this case, the screen or device may break. Another problem is the sweat of the runner. In this case, it is important to protect the smartphone against the entry of sweat. In that case, the terminal could also be damaged. Another option is to use a smartwatch or a band electronic bracelet.
Wearables and gadgets	
Pro	Cons
The best thing about this option is that it allows you to leave your mobile phone at home and go running with a device that is specifically designed for that. Many of these devices also have other functionalities such as sleep monitoring or receiving notifications from your smartphone.	The problem with this option is that you have to buy an additional device, with the expense that this entails. Another disadvantage is that not all wearables allow all the options that the smartphone does have (not all have GPS, not all allow you to listen to music, etc.. ..). In addition, wearables require downloading an application to view the results, so the user must ensure that the wearable purchased is compatible with your smartphone.

Table 4
Cronbach alpha, rho_A, Composite Reliability and AVE.

Variable	Cronbach Alpha	rho_A	Composite Reliability	AVE
Entertainment	0.878	0.882	0.918	0.74
Tourism Experience	0.765	0.825	0.892	0.806
Information	0.816	0.817	0.891	0.732
Mobile Convenience	0.855	0.87	0.932	0.873
Satisfaction	0.928	0.929	0.949	0.823
Self-Expression	0.892	0.905	0.933	0.822
Visit Intention for the City	0.765	0.823	0.893	0.806

procedure was applied to evaluate the statistical significance of the relationships of structural model (Chin, 1998).

4.1. Measurement model analysis

Reflective items were used in this model which were interchangeable equivalent manifestations of the same construct (Mackenzie and Podsakoff, 2003).

First, the individual reliability of the indicator loads (λ) was calculated. The minimum acceptance level as part of a construct was $\lambda > = 0.707$ (Carmines & Zeller, 1979). However, other authors considered this level to be excessively rigid for the initial stages of an investigation of a relatively unstudied phenomenon. These authors consider values of 0.5 or 0.6 as acceptable (Barclay et al., 1995)

Barclay, 1995; Chin, 1998). The commonality of a variable (λ^2) is the part of the variance that can be explained by the factor or construct itself (Bollen, 1989). All the values found in this study exceeded the minimum load levels (Hair, Sarstedt, Hopkins & Kuelwieser, 2014).

Cronbach's alpha and the composite reliability (CR) were used to find the internal consistency of a construct (see table 4) as explained in the research (Götz, Liehr-Gobbers, & Krafft, 2010). The internal consistency shows to what extent the items are measuring the same latent variable. Cronbach's alpha gives a value for the internal consistency for each construct and has values between 0 and 1, where a higher value has more internal consistency. The minimum acceptance limit for internal consistency of the construct is usually set between 0.6 and 0.7 (Hair, Babin, Money & Samouel, 2005).

All the constructs (see table 3) also satisfy the requirements for the Dijkstra-Henseler's indicator (ρA) (rho_A), as they are all above 0.7 (Dijkstra & Henseler, 2015).

AVE (Average Variance Extracted) shows the variance of a construct due to the measurement error existing in the indicators (Fornell & Larcker, 1981). A recommendation is given that AVE is $>= 0.50$, which means that more than 50% of the variance of the construct is due to its indicators. The values for Cronbach's alpha and Composite Reliability and AVE are presented in table 5.

Discriminant validity shows how much one construct is different to others. A high value shows weak correlation between constructs. The proposed model was analyzed in two stages for this measurement (Hulland, 1999). Firstly, the measurement model was analyzed and afterwards the structural model.

Table 5
Correlation and AVE.

	ENT	TOUE	INFORMATION	MOC	SAT	SE	VIC
Entertainment	**0.86**						
Tourism Experience	0.733	**0.898**					
Information	0.674	0.543	**0.856**				
Mobile Convenience	0.497	0.499	0.548	**0.934**			
Satisfaction	0.761	0.707	0.761	0.606	**0.907**		
Self-Expression	0.718	0.573	0.621	0.36	0.616	**0.907**	
Visit intention for the City	0.739	0.687	0.586	0.534	0.775	0.58	**0.898**

Table 6
Heterotrait-Monotrait Ratio (HTMT).

	ENT	TOUE	INF	MOC	SAT	SE	VIC
Entertainment							
Tourism Experience	0.883						
Information	0.797	0.675					
Mobile Convenience	0.574	0.593	0.654				
Satisfaction	0.845	0.822	0.874	0.677			
Self-Expression	0.802	0.686	0.722	0.407	0.667		
Visit intention to the City	0.892	0.855	0.718	0.64	0.898	0.681	

The measurement model evaluation checked that the square root of the AVE was greater than the ratio between the construct and the other model constructs (Fornell and Larcker, 1981).

A construct should share more variance with its measurements or indicators than with other constructs in a model (Henseler, Ringle & Sinkovics, 2009). Therefore, the square root of the AVE was calculated to make sure that it was greater than the correlation between the construct and the other constructs of the model. Table 3 shows that this condition was fulfilled for all of the latent variables in the model.

The constructs therefore share more variance with the indicators than with other constructs of the investigated model (Henseler et al., 2009) and have discriminant validity based on this first analysis.

Henseler, Hubona and Ray (2016) carried out simulation studies to show that a lack of discriminant validity is best detected by the heterotrait-monotrait ratio (HTMT). The heterotrait-monotrait ratio (HTMT) gives a value to the average of the heterotrait heteromethod correlation and the average of the monotrait-heteromethod correlation.

Heterotrait correlations should be smaller than monotrait correlations in a well-adjusted model. For this to be true, the HTMT ratio should be below 0.9 (Henseler et al., 2016). Table 6 shows that this condition is fulfilled in the proposed model and therefore the constructs have discriminant validity.

4.2. Structural model analysis

Estimations for the relationships of the structural model are given by the path coefficients (standardized regression coefficients), which are the hypothesized relationships between constructs. The magnitude, algebraic sign, and statistical significance of these were all analyzed.

Standardized path coefficients (β) explain the size of the contribution of the predictor variables to the variance of the endogenous variables. The variance of an endogenous variable can be explained by a latent variable by using the value found from multiplying the correlation coefficients of the two variables (Falk & Miller, 1992).

Analyzing these coefficients and their statistical significance allows the hypotheses of the proposed research to be studied. Chin (1998)) considered a value of β to be acceptable between 0.2 and 0.3, although a higher value is more favorable.

The bootstrapping statistical technique was used to find if a construct is supported or not. It is a nonparametric re-sampling technique which is repeated after randomly replacing the original sample to create a number of samples for the bootstrap test (Hair et al., 2011). Table 5 shows the results of this test for the values of β (Standard Path Coefficient), T-Statistics and P-Values. The hypotheses were found to be supported or not from these results.

The path coefficients calculation must be accompanied by a measurement of the statistical significance and fit of the hypotheses. The fit is measured by the statistical t-test after applying bootstrap re-sampling for 5000 subsamples. The Student's t-distribution was used with one tail, as the model gives the direction of the relationship.

The results (see table 7) show that the main predictors of Visit Intention for the City are: Satisfaction (β=0.579; t = 9.940) and Tourism Experience (β=0.278; t = 4.648). The predictors of Satisfaction were found to be: Entertainment (β=0.409; t = 7.787), Information (β=0.378; t = 6.811) and Mobile Convenience (β=0.196; t = 3.626). The predictors for Tourism Experience were found to be: Entertainment (β=0.632; t = 11.287) and Mobile Convenience (β=0.172; t = 3.071). The relationship of Information → Tourism Experience wasn't supported.

A multi-group analysis (Henseler, 2010) was carried out in order to test the potential moderating influence of gender and the frequency of running on the relationships in the research model. The sample was divided into two separate groups for men and women and then sub-divided into high-frequency runners (3−5 days per week or every day) and low-frequency runners (1−2 days per week). The measurement invariance of composite models (MICOM) was then analyzed (Henseler, Ringle & Sarstedt, 2016). This measurement checks that the effects of gender and the frequency of running is restricted to the path coefficients of the structural model and not to the parameters of the measurement model (Felipe, Roldán & Leal-Rodríguez, 2017).

Tables 8a and 8b show that the measurement invariance for gender is positive for the Entertainment, Information, Mobile Convenience, and Self-Expression variables. With frequency of running the only positive result was for Tourism Experience.

Table 9 shows the results of a multi-group analysis with PLS-MGA using permutations (). The moderation produced by gender effect and the frequency of running can be seen. Moderate relationships are shaded gray and indicate that the influence of Mobile Convenience on Satisfaction is moderated by gender. This means that there are significant differences in the satisfaction felt by men and women for the Convenience of using the RunninCity application.

Table 7
Path coefficients (β) and statistical significance.

	Hypothesis	β (Standard Path Coeff.)	T Statistic	P Value	CI	Supported	f^2
1	SE → MOC	0.360	5.728	0.000	(0.254,0.461)	Yes ***	0,149
2	SE → INF	0.621	15.372	0.000	(0,549,0,685)	Yes ***	0,626
3	SE → ENT	0.718	21.979	0.000	(0,662,0,773)	Yes ***	1065
4	MOC → SAT	0.196	3.626	0.000	(0,113,0,288)	Yes ***	0,091
5	MOC →TOUE	0.172	3.071	0.002	(0,083,0,266)	Yes **	0,045
6	INF→ SAT	0.378	6.811	0.000	(0,283,0,470)	Yes ***	0,246
7	INF →TOUE	0.023	0.331	0.741	(−0,089,0,140)	No	0,001
8	ENT → SAT	0.409	7.787	0.000	(0,319,0,494)	Yes ***	0,309
9	ENT →TOUE	0.632	11.287	0.000	(0,533,0,719)	Yes ***	0,476
10	SAT → VIC	0.579	9.940	0.000	(0,477,0,671)	Yes ***	0,466
11	TOUE→ VIC	0.278	4.648	0.000	(0,184,0,382)	Yes ***	0,108

Notes: For n = 500 subsamples based on distribution t (499) of one-tagged Student: * p <0.05 (t (0.05, 499) = 1.64791345);.
** P <0.01 (t (0.01, 499) = 2.333843952); *** P <0.001 (t (0.001; 499) = 3.106644601).

Table 8a
Results of the measurement invariance of composite models (MICOM) procedure (Gender).

Construct	Step 1 Configural Invariance	Step 2 Compositional Invariance Original Correlation	5%	Partial Measurement Invariance Established	Step 3a Equal Variances Variance Original Difference (M-W)	2.5%	97.5%	Equal	Step 3b Mean Original Difference (M-W)	Equal Means 2.5%	97.5%	Equal
ENT	Yes	0,999	0,998	Yes	−0,137	−0,333	0,33	Yes	0,135	−0,23	0,213	Yes
EXP TUR	Yes	0,999	0,996	Yes	−0,396	−0,381	0,387	No	0,064	−0,209	0,214	Yes
INFORMATION	Yes	1	0,998	Yes	0,292	−0,314	0,299	Yes	0,173	−0,204	0,203	Yes
MOC	Yes	1	0,997	Yes	0,029	−0,391	0,341	Yes	0,02	−0,197	0,207	Yes
SATISFACTION	Yes	1	1	Yes	−0,248	−0,331	0,337	Yes	0,231	−0,216	0,212	No
SE	Yes	1	0,998	Yes	0,013	−0,332	0,306	Yes	−0,032	−0,226	0,215	Yes
VIC	Yes	0,998	0,997	Yes	−0,358	−0,326	0,348	No	0,046	−0,228	0,217	Yes

Notes: ENT: Entertainment; EXP TUR: Tourism Experience; MOC: Mobile Convenience; SE: Self-Expression; VIC: Visit Intention for the City; M: Men; W: Women.

Table 8b
Results of the measurement invariance of composite models (MICOM) procedure (Running Frequency).

Construct	Step 1 Configural Invariance	Step 2 Compositional Invariance Original Correlation	5%	Partial Measurement Invariance Established	Step 3a Equal Variances Variance—Original Difference (RH-RL)	2.5%	97.5%	Equal	Step 3b Mean—Original Difference (RH-RL)	Equal Means 2.5%	97.5%	Equal
ENT	Yes	1	0,992	Yes	−0,033	−0,624	0,43	Yes	0,661	−0,399	0,341	No
EXP TUR	Yes	0,995	0,978	Yes	0,177	−0,83	0,497	Yes	0,305	−0,372	0,354	Yes
INFORMATION	Yes	0,999	0,991	Yes	0,105	−0,587	0,487	Yes	0,413	−0,38	0,354	No
MOC	Yes	0,998	0,989	Yes	0,47	−0,626	0,437	No	0,396	−0,376	0,334	No
SATISFACTION	Yes	1	0,999	Yes	0,163	−0,723	0,502	Yes	0,358	−0,369	0,349	No
SE	Yes	1	0,995	Yes	0,275	−0,647	0,447	Yes	0,634	−0,384	0,353	No
VIC	Yes	0,998	0,992	Yes	−0,381	−0,688	0,454	Yes	0,417	−0,383	0,339	No

Notes: ENT: Entertainment; EXP TUR: Tourism Experience; MOC: Mobile Convenience; SE: Self-Expression; VIC: Visit Intention for the City; RH: High frequency runner; RL: Low frequency runner.

Table 9
Multigroup analysis result.

	Hypothesis	Gender	Running Frequency
1	SE - MOC	0.107	0.492
2	SE - INF	0.187	0.782
3	SE - ENT	0.562	0.927
4	MOC - SAT	0.997	0.108
5	MOC - TOUE	0.215	0.882
6	INF - SAT	0.42	0.994
7	INF - TOUE	0.95	0.498
8	ENT - SAT	0.041	0.005
9	ENT - TOUE	0.245	0.434
10	SAT - VIC	0.009	0.113
11	TOUE - VIC	0.968	0.953

Notes: For n = 500 subsamples based on distribution t (499) of one-tagged Student:
* p <0.05 (t (0.05, 499) = 1.64791345);.
** P <0.01 (t (0.01, 499) = 2.333843952);
*** P <0.001 (t (0.001; 499) = 3.106644601).

The frequency of running (1−2 days per week, 3−5 days per week or every day) also moderates the relationships of Information and Entertainment on Satisfaction.

The determination coefficient (R^2) gives a measure of predictive power. It shows the variance of a construct that can be explained by the variables which predict an endogenous construct in the model. R^2 values can be between 0 and 1. A higher value means that the variable has more predictive ability for the model. The values of R^2 should reach a minimum level for explanatory power. Falk and Miller (1992) suggested a minimum level of 0.10. Chin (1998)) considered the following values and predictive capacity: 0.67 is substantial; 0.33 is Moderate; 0.19 is weak. Table 9 shows the results obtained in this study. The results show (see Figure 2) that the model explains 64.0% of the total variance (Visit Intention for the City) and it can almost be considered substantial. Satisfaction explains 71.8% of the total variance (substantial) and Tourism Experience explains 56.2% (moderate).

These results are shown in table 10.

The Stone-Geisser test (Q^2) was used to measure the in-sample predictive relevance of the dependent constructs. Using the blindfolding procedure, part of the data of a construct is omitted for a construct and replaced by estimated parameters. These estimated parameters are analyzed to try to reconstruct the parameters which were omitted (Chin, 1998). This is done by calculating the cross-validated redundancy (Q^2 = 1-SSE / SSO) to find if the latent variables of the endogenous variable can be predicted. This is done to examine the predictive relevance of the structural model. The omission value is between 5 and 10, which means that predictive relevance exists if $Q^2 > 0$.
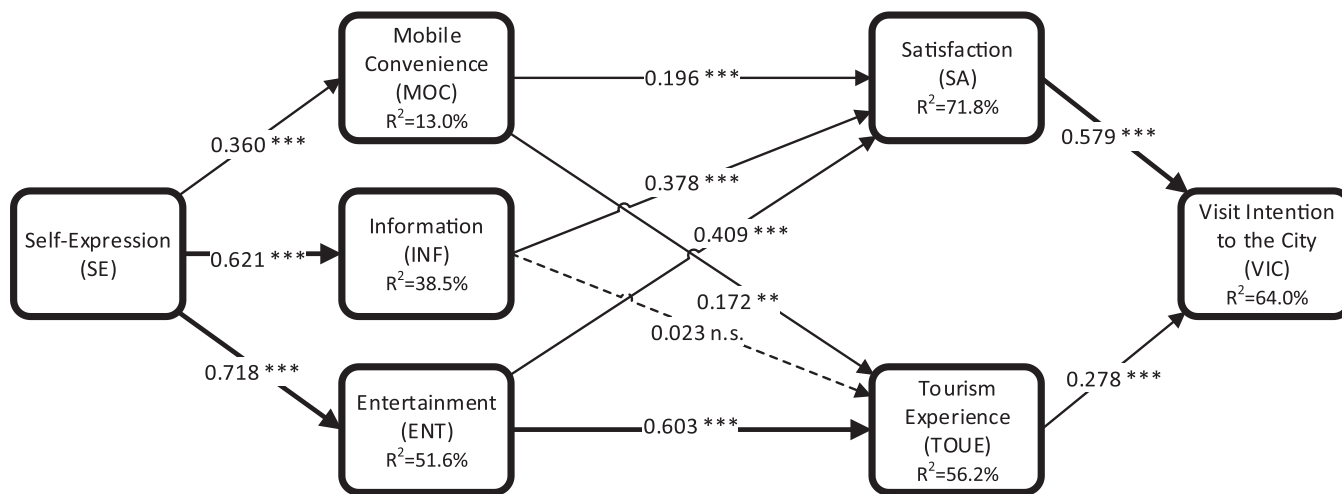
Fig. 2. Final structural model. Notes: → Supported, → n.s Not Supported. Effect: *p<0.05; **p<0.01 ***p<0.001.

The values obtained (see table 9) were less than 1 in all the cases tested in this study, Visit Intention for the City (0.486), Satisfaction (0.558), Tourism Experience (0.422), Entertainment (0.361), Information (0.268) and Mobile Convenience (0.107). This means that the structural model has predictive relevance.

5. Discussion

The results of this study show that the proposed extension of the Uses and Gratification Theory (U&G) model is applicable for the acceptance of innovative applications combining tourism and sports. The theoretical model was extended with the following constructs, Tourism Experience and Mobile Convenience. The original construct Convenience (CON) was varied to measure how convenient the user feels when using the mobile tourism application. Other constructs were used in the questionnaire but not in the model, such as Social Influence (SI), which is the influence of other users on the content which a user shared and the gratification felt from this influence. However, this construct was discarded because it did not reach the minimum value thresholds in the validation stage of the measurement model in the PLS-SEM analysis. Self-Expression (SE) explains the freedom that users feel they have to express opinions about their experiences with the application. It was included in the hypotheses as a construct that indirectly influences Satisfaction, Tourism Experience and Visit Intention for the City. It was also seen to influence Entertainment, Information and Mobile Convenience, and therefore adds another novel construct to the proposed model in this study which changes the original Uses and Gratification Theory (U&G) model with these three relationships. The Uses and Gratification Theory (U&G) model has been significantly changed by eliminating the Social Influence construct, extending Convenience to aspects exclusively associated with Mobile Applications and indirectly relating Self-Expression to Satisfaction.

Table 10
R^2 and Q^2.

Constructs	R Square	SSO	SSE	Q^2 (=1-SSE/SSO)
Entertainment	0.516	1036,00	661,528	0.361
Tourism Experience	0.562	518	299,597	0.422
Information	0.385	777	568,761	0.268
Mobile Convenience	0.130	518	462,384	0.107
Satisfaction	0.718	1.036,00	457,685	0.558
Self-Expression	–	777	777	–
Visit intention for the City	0.640	518	266,164	0.486

The initial structural analysis supports most of hypotheses that were analyzed with the β of each construct. H1 is supported with a 99.9% confidence level, which means that Self-Expression also influences Mobile Convenience (β=0.360; t = 5.728). This means that users feel that they receive the information they want from this application with little effort and without delay.

H2 (β=0.621; t = 15.372) was also supported and had a 99.9% confidence level. Users of the Runnin'City application share information about positive and negative experiences at a destination which can help decide which city to visit and enjoy the visit once there. The information published with the application is received faster than from anywhere else on the Internet. Users share this information quickly because they want to help other tourists or simply feel the need to share the information. Therefore, it seems that this application is designed for users who value Self-Expression.

However, the relationship with the highest load in the whole model is H3 in which Self-Expression influences Entertainment (β=0.718; t = 21.979) with a confidence level of 99.9%. This means that giving others the opportunity to enjoy visits to cities with Runnin City, wanting to help others or sharing personal positive and negative experiences at the places visited with Runnin'City strongly influences the user Entertainment with the application. This means that Self-Expression is one of the main variables in the model because of the relationship it has with Entertainment. It is really entertaining for users to share their experiences with other users to help them to decide if a city is worth visiting as a tourist destination.

The relationship of Mobile Convenience with Satisfaction, H4, (β=0.196; t = 3.626) has a 99.9% confidence level. It has a lower load than Entertainment and Information and is therefore the construct with the lowest influence on Satisfaction.

H5, the relationship of Mobile Convenience with Tourism Experience is also supported (β=0.172; t = 3.071) with lower values than H9 (Entertainment) and also a lower confidence level.

H6 shows that Information does have an important relationship with Satisfaction (β=0.378; t = 6.811) with a 99.9% confidence level.

H7 was not confirmed because (β=0.023; t = 0.331) which shows that Information does not influence Tourism Experience. This result, despite being negative, confirms that although the user learns a lot about the city with the Runnin'City application, this does not mean that the tourists' enjoyment or the knowledge they gain about places, art or history in the city necessarily come from the application. It must therefore be concluded that the main attraction of this tourism innovation is not the information which the application provides, but the Entertainment and Mobile Convenience of using it.

The relationship of Entertainment with Satisfaction (H8) is a significant hypothesis (β=0.409, t = 7.787) and is confirmed. The external variable Tourism Experience in the Uses and Gratification Theory (U&G) model is confirmed, as in other studies.

Entertainment had a strong influence on Tourism Experience (β=0.632; t = 11.287), which confirmed the hypothesis in H9. This means that the fact that users of Runnin'City find it entertaining or fun influences the enjoyment they have on their trip and increases their knowledge about the cities they visit.

This important finding, which has important practical implications, is supported by the fact that H9 is confirmed with more than 99.9% confidence level and is a relationship which is significant.

H10 is also supported with more than 99.9% confidence level and demonstrates that Satisfaction is positively related to Visit Intention for the City (β=0.579; t = 9.940) and with higher values than H3 (Mobile Convenience).

Finally, H11 is confirmed, meaning that Trust has a positive influence on Visit Influence for the City (β=0.278; t = 4.648). This relationship has 99.9% significance, which means that it is very important and shows that enjoyment on the trip, or the knowledge gained about the city by using the application, increased the users' intention to know the city better or visit another city using the same application.

6. Conclusions

The main theoretical contribution of this work is the incorporation of the new Tourism Experience construct to the Uses and Gratification Theory (U&G) model for the case of Tourism Innovation. This work shows that the U&G model is valid and applicable to tourist innovation with sufficient explanatory capacity, especially when considering the Satisfaction construct.

It must also be indicated that changes have been made to the Self-Expression relationships, which influences Satisfaction and Tourism Experience by means of Entertainment, Information and Mobile Convenience. This construct has been removed from the Social Influence relationship, which means that the application can work perfectly without social networks. Another implication is the transformation of the original Convenience construct to Mobile Convenience (MOC).

The results obtained will be very useful for academics and designers of innovative tourism applications to understand the importance of Self-Expression, Entertainment and Mobile Convenience in Tourism Innovation. The role played by Satisfaction is especially interesting as is that of Tourism Experience, since both variables directly influence Visit Intention for the City.

The proposed model is interesting for academics because of the way the model is used to investigate innovation and the chosen industry. With the evolution of new technologies and their exponential growth, the tourism sector can expect to see an increase in this type of applications in the near future. This study explores the innovative gratification model in a novel application and its success could be reproduced in the future by taking into consideration the results of this study.

The results obtained in this study also show the important difference in the way Mobile Convenience influences Satisfaction for men and women. Men and women feel differently about the usefulness of the Runnin'City application. Men believe that the application is more useful than women do. The frequency with which the subject goes running (1−2 days per week, 3−5 days per week or every day) moderates the relationship of Information and Entertainment with Satisfaction. The relationship is less relevant as the frequency of running increases. This means that this application will be enjoyed most by people who do not run very regularly. The frequency of tourism (1−3, 4−6 or more than 6 times per year) moderates the relationship of Satisfaction with Visit Intention for the City. The Visit Intention is greater for people who only travel a little. This application will be

seen to be most useful by men who don't travel very often and only run a few times a week.

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