Tourism Management 87 (2021) 104361

Contents lists available at ScienceDirect

Tourism Management

journal homepage: www.elsevier.com/locate/tourman

Assessing the moderating effect of COVID-19 on intention to use smartphones on the tourist shopping journey

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ARTICLE INFO

Keywords:
COVID-19
Tourist shopping journey
Technology acceptance models
Smartphone
Moderating effect
Performance expectancy
Effort expectancy
Social influence

ABSTRACT

This work proposes the first model to examine the moderating effect of the COVID-19 syndemic on the acceptance and use of smartphones during the tourist shopping journey. The model was tested with 1800 tourists, 900 non-COVID-19 (i.e. prior to COVID-19) and 900 during the COVID-19 period. The results showed that: 1) the model has better fit for the COVID-19 period as its explanatory capacity for that stage is greater ($R^2 = 0.773$) than for the non-COVID-19 period ($R^2 = 0.691$); 2) tourists have increased their intention to use smartphones, especially to make payments for purchases; and 3) there are statistically significant differences in the impact of four of the six model variables (performance expectancy, effort expectancy, social influence, and arousal). This research advances knowledge of the impact of COVID-19 on the technological behaviour of tourists, has important practical implications, and raises new research questions about the future of tourism.

1. Introduction

The technological device par excellence of the tourist is the smartphone (Rodríguez-Torrico et al., 2019). When tourists shop they rely on available sources of information, where the mobile has a privileged role (Coromina & Camprubí, 2016; Sirakaya & Woodside, 2005). The main reason for this is that tourist purchases involve a greater degree of uncertainty as they are made outside the tourist's normal environment and, consequently, the tourist has less knowledge of the situation (García-Milon et al., 2019). Smartphones facilitate the tourist's decision-making process during the tourist shopping journey (TSJ) (García-Milon et al., 2020), and are used to gather information from different sources, compare prices and products, check for product availability, and locate stores (Fuentes & Svingstedt, 2017). However, in the year 2020 something unimaginable happened, COVID-19 emerged, causing a worldwide syndemic (Horton, 2020). This dramatically affected both tourism and the retail sector. This reality has left the global tourist sector very damaged and new solutions and reformulations will be needed to ensure its survival (INE, 2020).

The highly contagious nature of COVID-19 means that activities that involve a high level of human interaction, such as tourism, cannot continue as they have done in the past (Wen et al., 2020). Measures that limit interpersonal contact are required (Fong et al., 2020); in this respect, the use of technologies, in general, has been seen as one of the best solutions to the need to maintain safe distance (Nanni & Ulqinaku, 2020; Zeng et al., 2020). For example, technologies are now more used to work, to study, to buy, and in leisure/free time activities. Given the normalisation of technology use in different areas, it is foreseeable that destinations and tourist companies will increase their use of technological devices in their client relations; and the smartphone has the highest penetration, and is the device most widely used (Ditrendia, 2018). Indeed, before the shutdown, the average daily use of mobiles was 160 min, but during the shutdown it increased to 204 min (Smartme Analytics, 2020). The shutdown has made people more accustomed to using technology, and there have even been suggestions that this will accelerate global digitisation by 6 years (de Pinedo, 2020).

Although it is true that the smartphone was already important in tourist activities (Choi et al., 2016; Law et al., 2018), creating fully-informed and autodidactic travellers, it is now necessary to examine whether the syndemic has modified the predisposition of tourists to use their mobiles. Although there is a boom in studies into the effects of COVID-19 on tourism (Zenker & Kock, 2020), its impact on tourists' technological behaviours is an unexplored field that needs to be addressed. To begin to bridge this gap the authors of the present study aim to identify the changes that COVID-19 has caused in tourists' intentions to use their smartphones on their TSJs, and to examine the origins of these differences.

To this end, this work presents the first model to examine the

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https://doi.org/10.1016/j.tourman.2021.104361
Received 2 July 2020; Received in revised form 15 March 2021; Accepted 20 May 2021
Available online 4 June 2021

moderating effect of the COVID-19 syndemic. The proposed model is based on the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), and incorporates emotional impact. The model is tested at two time points, one before the onset of COVID-19, and one during the shutdown, to assess differences in the antecedents of tourists' intentions to use smartphones on their TSJs. Finally, the significance of the differences between the results is analysed through a multi-group analysis. The results advance the knowledge of tourists' behaviours throughout their TSJs, provide practical recommendations for business management in the new COVID-19 reality, and raise new research questions about the future of tourism.

2. Literature review

2.1. Smartphones on the tourist shopping journey

Tourist shopping in tourist destinations is an entertainment activity supplementary to the main purpose of the trip; in the TSJ process tourists search for, select and buy products during their stays in destinations (Jin et al., 2017; Rabbiosi, 2011; Timothy, 2005). Previous studies have shown shopping to be among the activities that add most value to the tourist experience (Chen, 2013; Law & Au, 2000; Lloyd et al., 2011; Yüksel, 2007). It generates satisfaction and pleasure for tourists and allows them to participate in the local culture of destinations (Hsieh & Chang, 2006; Way & Robertson, 2013). In addition, shopping benefits destinations as it provides them with favourable images (Heung & Cheng, 2000; Jin et al., 2017) and is a great source of income (Chang et al., 2006; Jin et al., 2017). In sum, shopping is highly valued by tourists, and is very valuable for tourism service providers (Choi et al., 2016; Jin et al., 2017).

In addition, acquiring goods in destinations involves the series of steps that form the TSJ (García-Milon et al., 2020), which is a unique purchasing process as it is undertaken only by tourists. New technologies have modified the TSJ and, in particular, the smartphone has been adopted by tourists as an indispensable tool in their activities (Rippé et al., 2017; Wang et al., 2016). On the one hand, smartphones have reconfigured how tourists shop by creating hyper-connected consumers who can make purchases anywhere, at any time (Fuentes & Svingstedt, 2017). On the other, smartphones help satisfy tourists' multiple needs for mobility, information, and interaction (Wang et al., 2014), and are already considered the "ideal travel companion" (Rodríguez-Torrico et al., 2019). Thus, tourist shoppers use smartphones throughout their TSJs to support both their shopping and their tourism activities.

2.2. Acceptance and use of smartphones in tourism

The great majority of studies into the acceptance and use of smartphones in tourism have been undertaken in the last decade, which demonstrates a significant increase in academic interest (Kim & Law, 2015; Law et al., 2018). The most widely used theory is the technology acceptance model (TAM), introduced by Davis (1989). More recently, the UTAUT (Venkatesh et al., 2003) synthesised the main theoretical models of human technological behaviour (Ajzen, 1991; Davis et al., 1989; Moore & Benbasat, 1991; Thompson et al., 1991). Through the UTAUT these authors identified the key elements in the consumer's acceptance and use of technologies (Venkatesh & Davis, 2000; Venkatesh et al., 2003), showing that consumer intentions are affected by 4 factors: (i) performance expectancy, (ii) effort expectancy, (iii) social influence, and (iv) facilitating conditions (Venkatesh et al., 2003). These factors have been used to explain tourists' varied technological behaviours (e.g. Escobar-Rodríguez & Carvajal-Trujillo, 2014; San Martín & Herrero, 2012) and, more recently, tourist behaviour in the context of smartphone use (e.g. Bakar et al., 2020; Gupta et al., 2018). Among the virtues of the UTAUT is that it allows the addition of new variables without creating an unwieldy and overly complex model. In fact, Venkatesh et al., (2012, p. 173) noted that: "Future research can identify other relevant factors that may help increase the applicability of the UTAUT to a wide range of consumer technology use contexts."

Another good predictor of human behaviour, and important in technology adoption, are emotions. Previous studies have shown that emotions affect intentions and behaviours in the acceptance and use of technology (Beaudry & Pinsonneault, 2010; Lu et al., 2019; Partala & Saari, 2015). Emotions can be studied from a dimensional perspective; in this context pleasure-arousal emotions (Mehrabian & Russell, 1974), in particular, have been shown to be good predictors of tourist behaviour (Bigné & Andreu, 2004; Kulviwat et al., 2007; Yüksel, 2007). Few studies have incorporated pleasure-arousal emotions into technology acceptance models; an exception is Kourouthanassis et al. (2015) who, to capture emotional states as antecedent variables, incorporated arousal and pleasure factors into their examination of the acceptance of augmented reality maps. However, pleasure-arousal emotions have not, as yet, been used to explain intention to use, and the use of, mobile phones in tourist activities or on the TSJ.

While the benefits of combining cognitive and affective factors to better explain individuals' evaluations have been widely recognised in the literature, a debate continues about how these factors jointly affect attitudes towards acceptance and use of technologies (e.g. smartphones) (Tamilmani et al., 2019). In addition, the development of technology and digitisation-based contact-free solutions will be an essential element of the recovery from COVID-19.

2.3. COVID-19 impact on travellers

Tourism, due to its high level of human interaction, has been almost totally paralysed by COVID-19; it is, indeed, one of the sectors suffering most from the syndemic (Hoque et al., 2020). Worldwide, planes are parked on the ground, hotels are closed and travel restrictions are in place (UNWTO, 2020b). Uncertainty has taken hold of the sector, which is affecting countries, tourism service providers, and tourists. Tourists have high risk perceptions of travel due to the health alert (Neuburger & Egger, 2020). This is involving the adoption of new behaviours and practices such as: a greater number of cancellations (Huang & Min, 2002), fewer trips in public transport (Fall & Massey, 2005), greater numbers of last-minute reservations (Hystad & Keller, 2008), a reduction in activities with high human contact, a preference for outdoor activities (Wen et al., 2005), and greater attention being paid to hygiene and cleanliness (Higgins-Desbiolles, 2020).

Although this is an unprecedented global crisis, previous crises have seen the emergence of new concerns and apprehension in, and demands from, tourists (Chebli & Said, 2020). Some authors, such as Shaw et al. (2020), have pointed to lifestyle changes that may have long-term behavioural implications. In particular, according to Ivanov et al., (2020, p. 10), the "COVID-19 crisis may imprint upon some habits, behaviours and expectations in travellers in the post-viral world". Consequently, destinations have been seriously affected and need now to create specific protocols to allow tourism and associated activities to recover (UNWTO, 2020a).

2.4. Proposed model and hypotheses

To the authors' knowledge little attention has been paid to smartphones use in the TSJ, and none to the impact of a syndemic. The present study proposes an original model, taking into account the effects of COVID-19, which includes performance expectancy, effort expectancy, social influence and facilitating conditions presented in the UTAUT (Venkatesh et al., 2003), and Mehrabian and Russell's arousal-pleasure emotions (Mehrabian & Russell, 1974) as antecedents to explain tourists' smartphone use when shopping in destinations (Fig. 1). The constructs of the research model are described below.

2.4.1. Performance expectancy

This has been defined as the degree to which the tourist considers

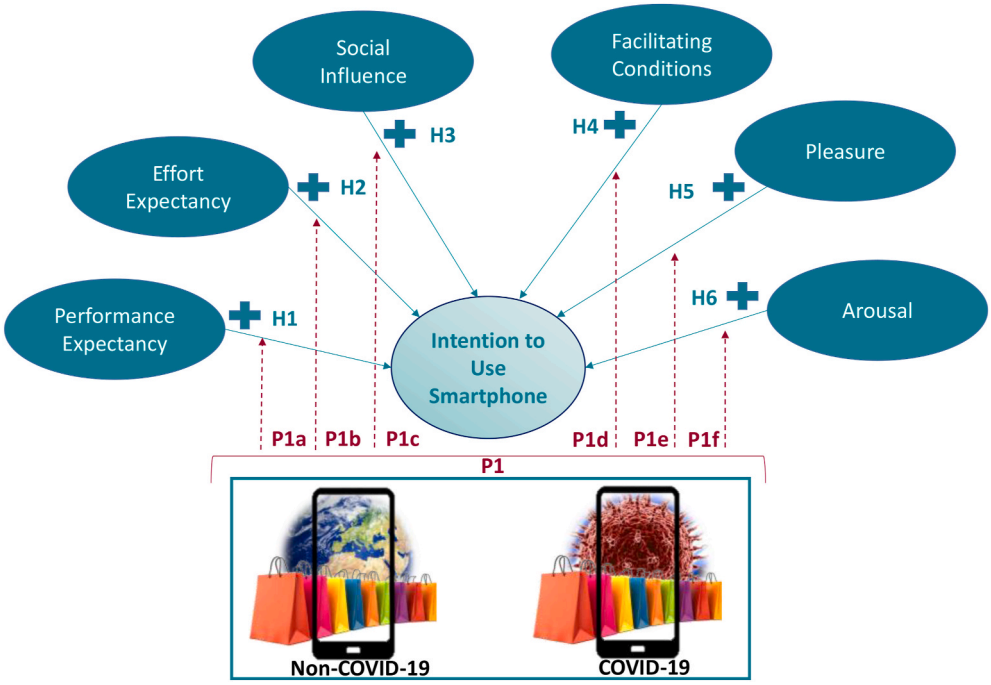


Fig. 1. Proposed model for analysing the moderating role of COVID-19 on intention to use a smartphone in tourist shopping.

that using a smartphone to buy in his/her destination will be beneficial to his/her performance (Venkatesh et al., 2003). This factor is considered essential in the acceptance of new technologies by consumers (Luo et al., 2010; Venkatesh et al., 2003). Previous studies have shown the positive effect of performance expectancy on behavioural intention (e.g. Alalwan et al., 2017; Baptista & Oliveira, 2015; Macedo, 2017). It has been shown in the tourism field that performance expectancy is significant and a positive antecedent of the acceptance of technology and innovations (Herrero et al., 2017; Ibukun et al., 2016) and in tourists' adoption of mobile applications (Gupta et al., 2018; Siang et al., 2016). In particular, it has been observed that smartphone performance expectancy in purchases positively affects behavioural intention (Hubert et al., 2017). Taking these points into account, we propose the following hypothesis:

H1. Performance expectancy has a positive effect on the tourist's intention to use smartphones when shopping in a destination.

2.4.2. *Effort expectancy*

This has been defined as the degree of ease associated with using a smartphone to make a purchase when carrying out tourist activities (Venkatesh et al., 2003). The predictive power of effort expectancy for behavioural intention has been widely accepted (e.g. Baptista & Oliveira, 2015; Ibukun et al., 2016; Macedo, 2017; Raman & Don, 2013). In purchases, effort expectancy has been found to have strong influence on new technology acceptance (Hassan et al., 2015; Juaneda-Ayensa et al., 2016). To take forward the knowledge of this factor in the context of tourists' use of smartphones to make purchases in their destinations, we propose the following hypothesis:

H2. Effort expectancy positively affects the tourist's intention to use a smartphone when shopping in a destination.

2.4.3. *Social influence*

This has been defined as the degree to which tourists perceive that people who are important to them believe they should use smartphones to make purchases in destinations (Venkatesh et al., 2003). People close to the consumer can affect his/her awareness of, and attitude towards, technologies (Alalwan et al., 2017). In general, the predictive power of social influence for behavioural intention is accepted (Ibukun et al., 2016; Macedo, 2017; Raman & Don, 2013; Venkatesh et al., 2003). In addition, it has been shown that social influence affects mobile adoption behaviours (Foley et al., 2007; Sim et al., 2014; Thorbjørnsen et al., 2007). A positive relationship between social influence and intention to use smartphones has been identified specifically in tourist shopping behaviour (Rodríguez-Torrico et al., 2019; Tan & Ooi, 2018). Taking into account the findings of previous studies, we propose the following hypothesis about social influence:

H3. Social influence positively affects tourists' intention to use smartphones when shopping in a destination.

2.4.4. *Facilitating conditions*

This has been defined as the degree to which an individual considers that there is an organisational and technical structure to support him/her in his/her use of smartphones to make purchases in destinations (Venkatesh et al., 2003). Facilitating conditions are important in predicting behaviour towards technologies (Ibukun et al., 2016; Macedo, 2017; Raman & Don, 2013). Consumers tend to look for assistance and support when using new technologies (Hew et al., 2016). Given this background, we propose the following hypothesis:

H4. Facilitating conditions positively affect the tourist's intention to use smartphones when shopping in a destination.

2.4.5. *Pleasure and arousal*

The dimensional approach facilitates the identification of different emotions and their classification into dimensions. Mehrabian and Russell (1974) developed the most popular dimensional approach used in consumer behaviour research, the pleasure-arousal-dominance (P-A-D) model, widely used in the hospitality and tourism field (Li et al., 2015). However, it has been shown that dominance is not linked to the individual's emotional responses and that the pleasure – arousal dimensions are appropriate for explaining a wide range of situations and, particularly, purchasing behaviour (Donovan & Rossiter, 1982; Yüksel, 2007). Therefore, there is general unanimity on the use of this emotion-based bidimensional approach (Bigné et al., 2005).

The pleasure dimension has been defined as the degree to which a

person experiences a good, joyful, happy or pleasant reaction to a stimulus; the arousal dimension has been defined as the degree to which a person experiences excitement, or stimulation, as a result of the combination of the physical activity and mental activation triggered by a stimulus (Kulviwat et al., 2007; Mehrabian & Russell, 1974).

Previous studies have supported that pleasure (Bruner & Kumar, 2005; Lee et al., 2003) and arousal (Lee et al., 2003) have a direct and positive effect on the acceptance of, and attitude towards, new technologies (Kulviwat et al., 2007). In the tourism and hospitality field, several studies have shown their importance in explaining tourists' purchasing behaviours (Bigné & Andreu, 2004; Yüksel, 2007; Yüksel & Yüksel, 2007) and their direct effect on the use of smartphones in tourist activities (Kourouthanassis et al., 2015).

H5. Pleasure experienced when using a smartphone while shopping in a destination has a positive effect on the tourist's intention to use the smartphone.

H6. Arousal experienced when using a smartphone while shopping in a destination has a positive effect on the tourist's intention to use the smartphone.

2.4.6. Moderating effect of COVID-19

The World Health Organization has described the SARS-Cov-2 virus that erupted globally in 2020 as creating a "COVID-19 context"; and, according to Horton (2020, p. 874) "COVID-19 is not a pandemic. It is a syndemic". In addition to the direct repercussions that SARS-Cov-2 has had on health (Wu & McGoogan, 2020), it has had a series of indirect consequences that have drastically and immediately affected human life (Bavel et al., 2020; Fong et al., 2020). Given the complexity of the interaction between the circumstances it has created (lockdowns, uncertainty, fear, …), it is necessary to delve into the syndemic's effects on behaviour patterns to establish the changes it has produced. Lockdowns have caused a reduction in social and physical contact with other people (Brooks et al., 2020). Technological resources have been used to connect with the outside world; these have made it possible to carry out daily activities and have reduced the negative feelings caused by social isolation (Manuell & Cukor, 2011). To this must be added that the highly contagious nature of COVID-19 has promoted the use of technology to control the spread of the syndemic, and the smartphone has been turned into a personal tracker (Hernandez-Orallo et al., 2020). Previous studies have shown that greater technology use leads to an increase in trust in the technology, and a reduction in fear of the technology (Wu et al., 2011), which in the long term creates in users greater intention to use the technology in more activities.

The COVID-19 context might condition behaviour patterns by modifying the intensity of how, and the way that, some antecedent factors affect intention to use smartphones during TSJs; that is, COVID19 may have a moderating effect (Little et al., 2007). Therefore, the present study incorporates COVID-19 as a moderating variable by analysing the differences between the two contexts: 1) a non-COVID-19 context, and 2) a COVID-19 context. Given the need to analyse the behavioural changes of tourists in this new context (Zenker & Kock, 2020), the present work analyses if there have been changes in the factors that affect tourists' use of smartphones in their purchases. Taking into account that we now face a new situation with no historical background, the following proposition is made:

P1. COVID-19 ("non-COVID-19" vs "COVID-19") plays a moderating role in the relationships between six exogenous variables and intention to use smartphones when shopping in a destination.

The proposition is divided into the following:

P1a. COVID-19 plays a moderating role in the relationship between performance expectancy and intention to use a smartphone when shopping in a destination.

P1b. COVID-19 plays a moderating role in the relationship between effort expectancy and intention to use a smartphone when shopping in a destination.

P1c. COVID-19 plays a moderating role in the relationship between social influence and intention to use a smartphone when shopping in a destination.

P1d. COVID-19 plays a moderating role in the relationship between facilitating conditions and intention to use a smartphone when shopping in a destination.

P1e. COVID-19 plays a moderating role in the relationship between pleasure and intention to use a smartphone when shopping in a destination.

P1f. COVID-19 plays a moderating role in the relationship between arousal and intention to use a smartphone when shopping in a destination.

3. Materials and methods

3.1. Sampling and questionnaire development

Two samples with gender and age quotas were used to test the model. The first sample was recruited during a period prior to the onset of COVID-19 (2018), and the second during the COVID-19 shutdown (2020). Trained interviewers were used for the non-COVID-19 sample, and digital means were used to disseminate and collect data for the COVID-19 sample. Both samples were the same size (900), and had similar age and gender proportions. We started with larger initial samples: the non-COVID-19 sample was 1066 tourists, and the COVID-19 sample was 1072 tourists (Table 1).

The choice of the ambit of the study, Spain, was based on the following: 1) Spain, with almost 40 million users, has one of the highest global smartphone penetration rates, being sixth in the world and second in Europe (Ditrendia, 2018); 2) Spanish tourists are among those who spend most on their travels, recently recorded as number 11 globally (Statista, 2020); 3) COVID-19 has had a strong impact in Spain, the country having one of the highest global percentage infection rates (Johns Hopkins University, 2020), that is, fifth worldwide, and first in Europe (Worldometer, 2020). The 1800 respondents confirmed that they were frequent tourists, smartphone users, and had intention to buy during their tourist trips.

The research questionnaire, originally rendered in English, was based on scales widely tested and validated in the literature (Mehrabian & Russell, 1974; Venkatesh et al., 2003). A sequential linguistic validation process was followed to guarantee the quality of the adaptation of the measurement scales to Spanish (Muñiz et al., 2013). An 11-point Likert-type scale was used, from 0 (totally disagree) to 10 (totally

Table 1
Technical data sheet of the study sample.

	non-COVID-19	COVID-19
UNIVERSE	Individuals over 18 years of age	Individuals over 18 years of age
SAMPLING PROCEDURE	Non-probabilistic, gender and age quota sampling	Non-probabilistic, gender and age quota sampling
DATA COLLECTION METHOD	Personal questionnaire	Online personal questionnaire
AMBIT	Spain	Spain
SAMPLE	900 individuals	900 individuals
PERIOD OF FIELDWORK	12 to November 23, 2018	18 April to May 21, 2020
PERSONAL CHARACTERISTICS OF THE SAMPLE		
GENDER	Men 50%; women 50%	Men 50%; women 50%
AGE	18–25 years: 20%; 26–35 years: 20%; 36–45 years: 20%; 46–55 years: 20%; 56 and over: 20%	18–25 years: 20%; 26–35 years: 20%; 36–45 years: 20%; 46–55 years: 20%; 56 56 and over: 20%

agree); the scale is based on the UTAUT model of Venkatesh et al. (2003) and on the pleasure and arousal variables of the PAD model (Mehrabian & Russell, 1974), in this case using dichotomous nominal variables. The variables used to test the model are shown in Table 2.

3.2. Data analysis

The SPSS 26 statistical software package and SmartPLS3 were used to analyse the data. Consistent partial least squares structural equation modelling (PLSc-SEM) was selected for the data analysis because: it is the most accurate option for models where all constructs are reflective (Dijkstra & Henseler, 2015) (as in our case); it is recommended for multigroup analyses (Dijkstra & Henseler, 2015); it is less sensitive to violation of assumptions of data normality (Chin, 1998; Ram et al., 2014); PLS-SEM, such as SmartPLS, is more robust than CB-SEM when data have a non-normal distribution (Leong et al., 2019); of the strong convergence between PLSc and CB-SEM techniques. Specifically, Dijkstra and Henseler (2015, p. 9) established that "PLSc as well as the five covariance-based SEM techniques exhibited neither significant nor substantial biases" … and that… "The raw bias of PLSc estimates and its standard deviation decreased, with an increase in sample size, which illustrates the consistency of PLSc".

Table 2
Measurement scale of the variables.

Construct	Items	Source
Performance expectancy (PE)	PE1. Using the smartphone for my purchases is useful PE2. Using the smartphone in my purchases increases my chance of achieving my goals PE3. Using my smartphone allows me to buy quicker PE4. Using my smartphone helps me to be more productive in the purchasing process	Adapted from Venkatesh et al., 2003
Effort expectancy (EE)	EE1. It is easy for me to learn to use the smartphone to make my purchases EE2. Using the smartphone for my purchases is clear and understandable EE3. It is easy for me to use the smartphone to make my purchases EE4. It is easy for me to be proficient in using the smartphone	
Social influence (SI)	SI1. People who are important to me think that I should use the smartphone in my tourist purchases SI2. People who influence me think that I should use the smartphone in my tourist purchases SI3. People whose opinions I value would prefer I use a smartphone in my tourist purchases	
Facilitating conditions (FC)	FC1. I have the resources necessary to use a smartphone in my tourist purchases FC2. I have the knowledge to use a smartphone for on-site tourist purchases FC3. The smartphone is compatible with other technologies I use for on-site tourist purchases FC4. I can get help from others if I have difficulty using my smartphone in my tourist purchases	
Pleasure (Pl)	Pl1. Unhappy – Happy Pl2. Annoyed – Pleased	Adapted from Mehrabian & Russell, 1974
Arousal (Ar)	Ar1. Relaxed – Stimulated Ar2. Calm – Excited	
Intention to use smartphone (IUS)	I have the intention to use a smartphone for on-site tourist purchases I will probably use a smartphone for on-site tourist purchases I have decided to use a smartphone for on-site tourist purchases	Adapted from Venkatesh et al., 2003

We followed five steps to undertake the research. First, a comparison of means was undertaken to observe any changes in intention to use smartphones during shopping activity in the destination. Subsequently, to test the hypotheses, the following steps were taken (Dijkstra & Henseler, 2015; Hair et al., 2013; Sarstedt et al., 2011):

- First, two groups were formed based on when the data was collected. Group 1 is formed by the sample that provided data before the onset of COVID-19 (non-COVID-19). Group 2 is made up of the sample who provided data collected during the COVID-19 shutdown (COVID-19). Both groups have similar age and gender proportions and were assessed using the same items, an essential condition for carrying out a multi-group comparison.
- Thereafter, the measurement model was evaluated by means of partial least squares consistent structural equation modelling (PLSc-SEM): the reliability and validity of the measurement scales were separately verified for each group.
- The structural model was evaluated by means of PLSc-SEM: the R^2, Q^2 and the path coefficients and their significance were calculated separately for each of the models, and the results compared.
- Finally, a multi-group analysis of the "non-COVID-19" and "COVID-19" groups was undertaken; to examine the differences between the path coefficients of the two models, a PLS consistent permutation test was undertaken.

4. Results

4.1. Comparison of means in smartphone use in the TSJ

First, an analysis was undertaken to identify if there were statistically significant changes in intention to use smartphones during TSJs to make purchases in tourist destinations between the time periods analysed; to do so we distinguished between the uses to which smartphones can be put during the purchase process (Table 3). The results suggested that intention to use smartphones in TSJs in destinations increased statistically significantly for: 1) searching for information about products; 2) comparing product prices; 3) comparing products; 4) discovering other buyers' opinions; 5) redeeming discount coupons; and 6) making payments in shops at the tourist destination.

Graphic 1 shows the mean values obtained for each of the factors in the two time periods and the percentage variation between the factors. It should be noted that performance expectancy presents the highest average variation (29.76%), and social influence the lowest (−2.22%).

4.2. Hypotheses verification

4.2.1. Evaluation of the measurement model

This section assesses the reliability of the items, and the construct reliability, the convergent validity, and the discriminant validity of the model (Table 4). The loadings, or correlations, between the items and the constructs show the individual reliability of each item. The standardised loadings for the items were all higher than 0.70, and the t-values were significant ($t > 1.96$, confidence level of 95%). Therefore, they comply with the established conditions (Hair et al., 2013).

Construct reliability was confirmed through composite reliability (CR) and Cronbach's *alpha*. CR far exceeded 0.7 for all factors, and the Cronbach's *alpha* values were all above 0.7. These results suggest good reliability and confirm the reliability and internal consistency of the scales.

The convergent validities of the constructs were satisfactory, the average variance extracted values (AVE) being greater than 0.5 for all variables, which means that over 50% of the variances observed in the

Table 3
Differences in means between non-COVID-19 and COVID-19 in smartphone use in TSJs.

Smartphone uses	Moment	Mean value	Dif.	Stan. Dev.	Mann–Whitney U	
					U	Sign.
To search for information about products	Non-COVID-19	4.690	0.37	3.244	277,878	≤0.000
	COVID-19	6.440		2.835		
To compare product prices	Non-COVID-19	4.310	0.38	3.316	288,848	≤0.000
	COVID-19	5.960		3.062		
To compare products	Non-COVID-19	4.100	0.38	3.228	293,333.5	≤0.000
	COVID-19	5.660		3.134		
To obtain the opinions of other buyers	Non-COVID-19	4.100	0.48	3.335	269,076	≤0.000
	COVID-19	6.060		3.054		
To share photos of purchases with friends and family	Non-COVID-19	4.880	0.02	3.407	397,628.5	0.501
	COVID-19	4.970		3.425		
To redeem discount coupons	Non-COVID-19	2.570	0.77	3.03	263,066	≤0.000
	COVID-19	4.550		3.307		
To pay at destination stores	Non-COVID-19	1.960	1.23	3.089	246,351	≤0.000
	COVID-19	4.370		3.709		

items were accounted for by their factors, and not by other constructs. Discriminant validity was also confirmed, as the square roots of the AVEs in all cases was higher than the inter-construct correlations (Roldán & Sánchez-Franco, 2012). In addition, the heterotrait-monotrait ratio (HTMT), and the confidence intervals for the HTMT, supported the model's discriminant validity (Henseler et al., 2015).

To test for the existence of common-method bias, a process originally proposed by Podsakoff et al. (2003), and later suggested by Tehseen et al. (2017), was conducted. This procedure is designed to detect the presence of any method variance effects. A "marker variable" was introduced into the model, and the structural parameters were analysed both with, and without, this variable to determine whether it had an effect on the endogenous construct of the model (in our case, intention to use smartphones in TSJs). The R^2 values for the endogenous construct observed after inclusion of the marker variable were 0.691 for the non-COVID-19 model, and 0.773 for the COVID-19 model, the same as observed before the introduction of the variable. These results suggest there is no substantial CMB. In addition, a full collinearity test showed that the variance inflation factor (VIF) measures were less than 3.3. This suggests the model has no problems of collinearity; and, indeed, some authors have suggested that a full collinearity test is equivalent to the common-method bias test often employed in covariance-based SEM (Kock & Lynn, 2012).

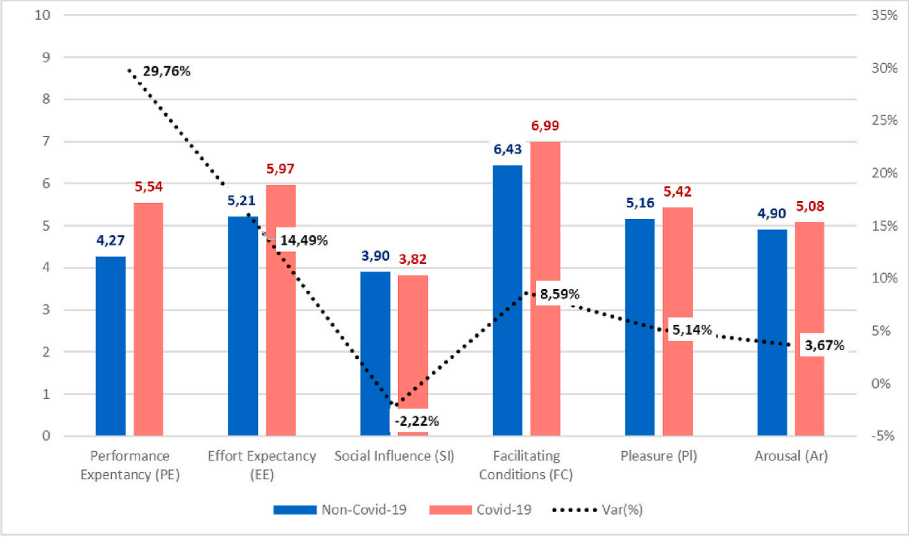
Also, a field study was conducted to address the problem of non-response bias (by obtaining the maximum possible valid responses) (Yüksel, 2017). A response rate of 33.5% was finally obtained, which is a good indication of the quality of the surveys and reduces the probability of non-response bias (Manfreda et al., 2008). Second, the extrapolation method (Armstrong & Overton, 1977) was used to compare the mean differences between early responders and respondents who answered after the last call; this verified that no non-response bias problem exists.

4.2.2. *Evaluation of the structural model*

After validating the scales, we tested the proposed hypotheses by estimating both global models (non-COVID-19 and COVID-19). The R^2, the Q^2, the direct effects, the p-values and the significance of each explanatory variable were calculated separately for the two models (Table 5).

The R^2 for the non-COVID-19 period returned a result of 69.1%, and for the COVID-19 period 77.3%. The Q^2 values obtained were 0.652 for the non-COVID-19 model and 0.738 for the COVID-19 model. These data suggest that the proposed model has high explanatory and predictive capacity for intention to use smartphone in TSJs in tourist destinations during both periods, being somewhat higher in the COVID-19 case.

To obtain the main predictors of intention to use smartphones in various situations the direct effects and p-values were calculated. In



Graphic 1. Mean values and variations, Non-COVID-19 vs. COVID-19.

Table 4
Construct reliability, convergent validity and discriminant validity.

	Construct	Compound reliability >0,7	Cronbach's *alpha*	Average variance extracted (AVE) > 0,5	PE	EE	SI	FC	Pl	Ar	IUS
Non-COVID-19	PE	0.956	0.956	0.846	**0.920**	0.826	0.502	0.625	0.682	0.613	0.786
	EE	0.963	0.963	0.868	0.826	**0.932**	0.349	0.755	0.639	0.543	0.724
	SI	0.956	0.956	0.880	0.503	0.349	**0.938**	0.367	0.328	0.368	0.542
	FC	0.866	0.867	0.619	0.626	0.756	0.367	**0.787**	0.527	0.435	0.602
	Pl	0.945	0.945	0.896	0.682	0.639	0.328	0.529	**0.947**	0.813	0.651
	Ar	0.912	0.911	0.838	0.613	0.543	0.368	0.438	0.814	**0.915**	0.574
	IUS	0.968	0.967	0.909	0.786	0.724	0.542	0.604	0.651	0.574	**0.953**
COVID-19	PE	0.952	0.952	0.831	**0.911**	0.801	0.728	0.662	0.589	0.602	0.852
	EE	0.926	0.924	0.758	0.799	**0.871**	0.658	0.724	0.529	0.528	0.736
	SI	0.978	0.978	0.937	0.727	0.655	**0.968**	0.502	0.477	0.504	0.676
	FC	0.838	0.843	0.566	0.672	0.730	0.510	**0.752**	0.497	0.448	0.650
	Pl	0.956	0.956	0.916	0.590	0.529	0.477	0.502	**0.957**	0.787	0.639
	Ar	0.945	0.944	0.895	0.602	0.526	0.504	0.453	0.787	**0.946**	0.652
	IUS	0.981	0.981	0.945	0.852	0.736	0.676	0.655	0.639	0.651	**0.972**

Note: The diagonal numbers (in bold) are the square root of the average variance extracted (AVE). The off-diagonal elements are the inter-construct correlations. The elements above the diagonal are the HTMT values.

Table 5
Effects on the endogenous variable.

	Construct	R^2	Q^2	f^2	Direct effects	p-value	% variance explained	Support for hypothesis
	Intention to use Smartphone (IUS)	0.691	0.652					
Non-COVID-19	H1: PE → (+) IUS			0.099[b]	0.361	≤0.000	28.37%	Supported
	H2: EE → (+) IUS			0.025[a]	0.191	0.002	13.83%	Supported
	H3: SI → (+) IUS			0.102[b]	0.213	≤0.000	11.54%	Supported
	H4: FC → (+) IUS			0.005	0.06	0.131	3.62%	Not supported
	H5: Pl → (+) IUS			0.031[a]	0.187	≤0.000	12.17%	Supported
	H6: Ar → (+) IUS			0.000	−0.008	0.848	−0.46%	Not supported
COVID-19	Intention to use Smartphone (IUS)	0.773	0.738					
	H1: PE → (+) IUS			0.343[c]	0.553	≤0.000	47.12%	Supported
	H2: EE → (+) IUS			0.003	0.049	0.283	3.61%	Not supported
	H3: SI → (+) IUS			0.012[a]	0.078	0.018	5.27%	Supported
	H4: FC → (+) IUS			0.020[a]	0.101	0.001	6.62%	Supported
	H5: Pl → (+) IUS			0.014[a]	0.094	0.006	6.01%	Supported
	H6: Ar → (+) IUS			0.028[a]	0.134	≤0.000	8.72%	Supported

Note.
[a] Small effect size.

[b] medium effect size.

[c] Large effect size.

addition, the effect size for each path was calculated to obtain the importance of the variables in explaining the endogenous variable. In tourism, values of 0.01, 0.06, and 0.14 have been determined to be small, medium, and large effect sizes (Khalilzadeh & Tasci, 2017). The results showed that the main predictors of intention to use smartphones in the non-COVID-19 period were, in order of importance, performance expectancy, effort expectancy, pleasure, and social influence. Intention to use smartphones to shop at tourist destinations during the shutdown presented some differences. Although performance expectancy remained the main predictor of intention behaviour, its influence was significantly greater than in the non-COVID-19 period. In addition, arousal, facilitating conditions, pleasure, and social influence were also shown to have impacts. Therefore, H1, H2, H3 and H5 can be accepted for the non-COVID-19 period, and H1, H3, H4, H5 and H6 for the COVID-19 period.

4.2.3. Multi-group analysis

A permutation test was employed to assess the measurement invariance of the model (Henseler et al., 2016), and it was found that the configural invariance criteria were met. In addition, partial measurement invariance for both groups was achieved for all model variables. These results allowed a multigroup comparison to be made between the two groups to analyse the moderating effects of COVID-19; in this multigroup analysis (Sarstedt et al., 2011) the data collection periods were the categorical variables used to compare the samples. This analysis is a non-parametric approach, based on permutations, using PLSc. The permutation algorithm allows us to test if the data groups have statistically significant differences in their group-specific parameter estimates (e.g. outer weights, outer loadings and path coefficients).

The results showed statistically significant differences between the two samples in performance expectancy, social influence, and arousal, at a significance level of 99%, and in effort expectancy at a significance

Table 6
Multi-group comparison of the explanatory variables.

Non-COVID-19 vs. COVID-19	Non-COVID-19	COVID-19	Difference	$P_{H\ permutation\ test}$	Support for propositions
P1a: PE → IUS	0.361	0.553	−0.191	0.007	Supported
P1b: EE → IUS	0.191	0.049	0.142	0.060	Supported
P1c: SI → IUS	0.213	0.078	0.135	0.001	Supported
P1d: FC → IUS	0.060	0.101	−0.041	0.446	Not supported
P1e: Pl → IUS	0.187	0.094	0.094	0.107	Not supported
P1f: Ar → IUS	−0.008	0.134	−0.143	0.003	Supported

level of 90%. Therefore, propositions P1, P2, P3, and P6 can be accepted (Table 6).

Although performance expectancy was important in non-COVID-19, it is now crucial; its explanatory capacity has been greatly increased by COVID-19, rising from 28.37% in the non-COVID-19 model, to 47.12% in the COVID-19 model. Effort expectancy has gone from being the second most important variable for predicting smartphone use (13.83%), to having no statistically significant effect.

As for social influence, it was observed that the relative importance of the influence exerted by those in the subject's immediate environment on his/her intention to use a smartphone for purchases was considerably diminished. The explanatory capacity of the variance was 5.27%, approximately half that of the non-COVID-19 stage (11.54%).

Arousal underwent a change in terms of level of emotional activation, reflecting a higher arousal and attention state while using smartphones during the TSJ. Arousal, previously not seen as being a significant antecedent of intention to use a smartphone in this context, became the second most important factor, explaining 8.72% of the variance.

5. Conclusions

The COVID-19 syndemic has dealt heavy human and economic blows. One of the sectors most particularly affected is tourism, which has seen the cancellation of the vast majority of activities, and forecasts predict that its recovery will be slow and complex (UNWTO, 2020b). Other crises have affected the tourism sector, but none have done so at a global level or at a time of technological development as advanced as the present day (Gössling et al., 2020). While it is true that digital developments were already changing tourist behaviours, the coronavirus syndemic may profoundly influence the way they travel and behave (Zenker & Kock, 2020). No studies have, as yet, analysed the possible changes in the technological behaviour of tourists that COVID-19 has caused, and may yet cause. For this reason, the present study develops a theoretical model that compares tourists' intention to use smartphones on their TSJs in their destinations before, and during, the syndemic. The main contributions of the present study are: 1) the developing and testing of the first model to examine the moderating effect of the COVID-19 context on the use of smartphones in tourist purchases; 2) the incorporation into the model of the level of emotional activation (arousal) evoked by the use of smartphones on the TSJ; 3) the study into how the antecedents of acceptance and use of a mobile technology have changed in a new context; and 4) the clarification of the role of the smartphone in the new COVID-19 scenario.

The first conclusion to be drawn from this work is that COVID-19 has changed how, and how much, tourists will use their smartphones on their TSJs. This allows us to conclude that the syndemic has increased the functionality of the smartphone; we suggest that tourists will make more use of smartphones on their TSJs, as their score increased in 6 of the 7 proposed benefits, with the greatest changes being in scores related to payments (redeeming coupons and paying), which were also those related to greater reticence to use in the non-COVID-19 stage. As to tourists' future intention to use mobiles, the results showed that this has increased by 20.55%. It seems evident that the barriers to using smartphones as payment instruments have probably fallen, because during the pandemic electronic payment systems were recommended, even mandatory. This leap forward in the acceptance of the mobile as a payment tool can be seen as a step towards further acceleration of the digital economy, already clearly evident in some countries (e.g. Sweden).

The second conclusion is that the proposed model better explains intention to use smartphones during TSJs at destinations in the COVID-19 context. The explanatory and predictive capacity of the model is greater for the COVID-19 stage ($R^2 = 0.773$, and $Q^2 = 0.738$) than for the non-COVID-19 stage ($R^2 = 0.691$ and $Q^2 = 0.652$). As can be seen, the results obtained from the COVID-19 model present lower residual errors in the values of the estimated variables. This greater ability to explain usage intention is related to the increase in the explanatory capacity of the model, and the incorporation of factors such as level of excitation, or alertness (arousal), which was shown to represent more than 13% of the direct effect of intention of use.

The third conclusion is related to variations both in the evaluations, and in the effects, of the factors analysed. Regarding the evaluations, the increase in utilitarian motivations (performance expectancy increased by 29.76%) and the reduction in social influence (−2.1%) should be highlighted. Moreover, statistically significant differences in the effects of four of the six analysed antecedents were demonstrated: performance expectancy, effort expectancy, social influence, and arousal.

The data obtained allow us to conclude that the factors that will influence tourists to use smartphones in the new normality are the speeding up of, and obtaining better results on, their TSJs. With this we have seen how a health-risk situation, accompanied by a requirement for social distancing, has obliged consumers to use their smartphones and increased tourists' positive disposition towards technology. By using their mobiles, tourists will seek to achieve greater practical benefits during their TSJs, through investing less time and obtaining better results. On the other hand, the importance of the ease of use of mobiles to make purchases (effort expectancy) has been shown to have diminished. This may be because the smartphone is now more viewed, in comparison to the non-COVID-19 era, when it was regarded as mainly useful for leisure/pleasure, as a practical instrument. This idea is reinforced with the variation in the importance of pleasure, although the results do not show statistically significant differences in the direct effects in the two models. Regarding the facilitating conditions dimension, in the non-COVID-19 stage we found no evidence that it was a predictor of use in tourist purchases. However, in the COVID-19 model it was shown to be the third most important predictor of tourist behaviour (with 8.72% of explained variance). These data can be interpreted as an indication of the importance that tourists now give to the availability of the resources and knowledge necessary to use the mobile to make purchases in destinations. In addition, it is important for tourists that their mobiles are compatible with other technologies that they will find in their destinations (e.g. tablets, touch screens).

5.1. Theoretical implications

As to the theoretical implications, this is the first study to use the context created by the COVID-19 syndemic as a moderating factor for a specific human behaviour, that is, intention to use smartphones during TSJs. COVID-19 has brought about the emergence of a new context for tourism, shopping, and technology use; our purpose is to look at the differences between the two contexts, non-COVID-19, and COVID-19.

Another theoretical implication of the study is that it extends the UTAUT model by including the arousal and pleasure emotions. This new model incorporates the intensity of emotion in technological acceptance to explain the purchase intentions of tourists in destinations. The result is a complete model, but one that meets the parsimony criterion. The model has not previously been applied and, with 5 antecedent variables, it achieves high explanatory and predictive power in the new COVID-19 context ($R^2 = 0.773$; $Q^2 = 0.691$). This is in line with Kulviwat et al. (2007), and Tamilmani et al. (2019), who showed that affect, measured through pleasure and arousal, can impact on utilitarian motivation (performance expectancy) and improve the explanatory power of the UTAUT.

There is evidence that an inverse relationship exists between the importance of the predictive factors of new technology acceptance, based on the purpose of the technology: Tamilmani et al. (2019, p. 223) stated that "the role of perceived usefulness as dominant predictor of information systems acceptance is not universal. Researchers have reported numerous expectations to this pattern where perceived enjoyment and ease of use played dominant role in user acceptance in information systems in home or leisure environment, games and

game-based training of work-related environment, diminishing the role of perceived usefulness". In the present study an opposite effect is proposed; changes in perceptions of the mobile's functionality due to the syndemic have caused performance expectancy to increase in importance, and ease of use (effort expectancy) and pleasure to reduce in importance. This is new double evidence: a) that moves forward the debate regarding the conditioning factors in new technology acceptance models; and b) of the impact of COVID-19 on the changes in tourists' perceptions of mobile technologies.

Another important theoretical implication of the study is the possible change in social influence on tourist behaviour as a result of the syndemic. It is possible that the shutdown has affected the social nature of individuals, in that our results show that their behaviours are now less influenced by their immediate environment. Spain is a country with a high level of socialisation and the limitation of social contacts has changed individuals' attitudes towards new technology adoption, that is, they now take less account of what others think.

5.2. Managerial implications

The results of this research allow us to propose a series of operational implications to promote the reactivation of tourist shopping through secure, technology-mediated methods. Destination managers, tourism companies, retailers and retailer associations must understand that the COVID-19 context has affected the technological behaviour of tourists, and they should make efforts to technologically transform destinations and offer tourists greater possibilities to use their mobiles in their TSJs and, thus, promote a better tourist shopping experience.

The COVID-19 effect is most manifest in the growth in importance of performance expectancy, and tourists will use their mobiles if they believe they will help them improve their performance in their TSJs. Thus, the study's recommendations are aimed at two groups. First, tourist destinations managers, focused on improvements in their information systems and, second, retailers, with a focus on enhancing the service they provide to tourists, online and offline.

5.2.1. Tourist destination management

Tourists after the COVID-19 will accept and be willing to use mobile applications that allow them to obtain information about shopping opportunities in destinations, compare products and prices, and access the opinions of other tourists. Destinations should recognise that smartphones aid social distancing during information searches on the TSJ. However, to promote the use of smartphone apps, the apps must provide information very quickly, thus accelerating the overall process. Therefore, destination managers should provide their visitors with personalised information. To do so, they should use intelligent systems to identify the types of search carried out by tourists who register at the destination. This will enable them to adapt the information to the needs of the individual tourist, and consequently accelerate the purchasing process in time, productivity and safety terms.

In addition, it is suggested that managers undertake tests to assess the level of excitement associated with the use of smartphone apps on TSJs. This is consistent with Kulviwat et al. (2007), who argued that advertising professionals should design their campaigns to communicate not only the technological performance of their products, but also the excitement that can felt when using them.

5.2.2. Retailers

The current COVID-19 situation limits shops' capacities and imposes social distancing. Therefore, the smartphone must become a key element in increasing the service levels offered to tourists in tourist destinations. Another great change caused by the syndemic is in the tourist's desire to use his/her mobile as a payment instrument (increased by 123%), so it would be appropriate to facilitate mobile-based electronic payments and to accelerate the move towards the digital economy. Therefore, shops must have the technological means to accept smartphone payments from tourists.

In short, retailers, to optimise the efficiency and profitability of the purchasing process, should provide applications that allow tourists to improve their shopping experiences in their shops: first, as sources of information; second, by helping them organise their shopping itineraries and; third, by providing a fast means of payment.

6. Limitations and future research directions

Finally, this work has limitations that should be addressed in future research. First, a set of variables was considered as antecedents of tourists' use of smartphones in purchases in destinations. However, future studies might expand the set of explanatory variables and/or barriers and, thus, extend models of technology acceptance such as UTAUT2 (Venkatesh et al., 2012). Second, the proposed models were tested on a large sample of Spanish-based tourists. The results may be conditioned by the socio-cultural characteristics of Spanish tourists; for instance, the effect of the COVID-19 crisis may be different in other countries with less social contact. Future studies might replicate the model for other countries to identify if the results differ based on degrees of socialisation and digitisation. Third, as it was not possible to carry out face-to-face surveys during the lockdown, the data collection method used was different in the two periods. This may have introduced some bias into the results, and future research must try to use the same means of data collection. To carry out this comparative study two large samples were examined over two specific time periods. At a global level, purchases by tourists are increasingly important for the development of destinations; therefore, it would be interesting to use large panels of tourists to conduct longitudinal studies and evaluate changes in TSJs over time. As a complement to this approach, future studies might use other methodologies, such as growth curve models, to analyse, over time, the evolution of the acceptance and use of smartphones in TSJs.

This study is just the beginning of the assessment of the impact of the short-, medium-, and long-term changes caused by the COVID-19 syndemic. Thus, to stimulate discussion and further research, Table 7 integrates previous ideas and poses future research questions.

Impact statement

This research allows to promote the reactivation of tourist shopping through secure, technology-mediated methods. Destination managers, shops and tourism companies must understand that COVID-19 has affected the technological behaviour of tourists, and they should join efforts to technologically transform destinations and offer tourists greater possibilities to use their mobiles in the purchase process and, thus, promote tourist shopping. Concretely, this study: 1) proposes and tests the first model to examine the moderating effect of COVID-19 on the use of smartphones in tourist shopping journey; 2) explains how the antecedents of acceptance and use of a mobile technology have changed in a new context; and 3) clarifies the role of the smartphone in the new, post-COVID-19 scenario.

Credit author statement

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Table 7
Future research questions.

ASPECT	FUTURE RESEARCH QUESTIONS
Model	Could other variables, such as motivation or habit, be introduced to analyse differences between the non-COVID-19, COVID-19, and post-COVID-19 contexts? What results would be obtained if other models of technology acceptance or consumer behaviour were used? Could the model used in this study be extrapolated to explain technology use in other tourist activities?
Study ambit	Has it been shown that the level of technological development of a country causes differences in the impact of the syndemic on the TSJ? Are the results replicated in other socio-cultural contexts? Are there differences between countries in terms of the impact of the COVID-19 syndemic?
Social influence	When we are isolated from others, is our nature as social beings influenced? Will the effects continue after the social distancing rules are relaxed? Will this be a one-off impact, or will there be any permanent effects on future behaviours?
Tourist Shopping Journey	How will people want to travel and shop after the syndemic? Will the in-store experience continue to be valued, or will other purchase models be more prevalent (e.g. online shopping, showrooming, webrooming, etc.)? What other aspects of the TSJ have been modified by the syndemic?
COVID-19 Technology Context	What role will technology play in the TSJ in the post-COVID-19 period? Will the changes seen in technological use be permanent, or will they be reversed after COVID-19? What has happened with other tourist activities in terms of intention to use, and the use of, technologies? Has COVID-19 increased the digital divide between generations? What functions should technology develop to use on the TSJ (design specifications)? What technologies will be most appropriate to enhance the TSJ experience (e.g. robots, chatbots, wearables, insideables, virtual and augmented reality)?

Funding

This research has been made possible thanks to the support of the Extraordinary Chair of Commerce of the University of La Rioja and the Logroño City Council and funded by a predoctoral contract FPI-UR 2019. The authors would also like to acknowledge the COBEMADE research group at the University of La Rioja (reference REGI 2020/40) and the autonomous community of La Rioja through the program RIS3 Ref: CAR - PID 2019-105764RB -I00.

Declaration of competing interest

The authors declare no conflict of interest.

Acknowledgments

The authors would like to thank the City Council of Logroño (Spain) for promoting the Chair of Commerce as an innovation laboratory for urban retailing operations and their interest in the new field of study of shopping tourism.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tourman.2021.104361.

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