Cultural intelligence as an antecedent of satisfaction with the travel app and with the tourism experience

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A B S T R A C T

Smartphones and apps exert a decisive influence on the tourism industry. However, cultural differences can be a barrier to technology-transfer and they influence all aspects of individuals' behavior. In this regard, cultural intelligence (CQ) enables individuals to deal more effectively with these differences, and those with a high CQ are more adaptable and able to cope in cultural environments other than their own. The aim of the present study is to propose and validate a model in which CQ is an antecedent of satisfaction with the travel app and with the tourism experience. Based on a sample of 243 Spanish tourists who used a travel app on their trip, the study finds that a tourist's CQ influences their satisfaction both with the app and with the tourism experience. It further demonstrates the influence of satisfaction with the travel app on satisfaction with the tourism experience. This research holds a series of implications of significant interest both for scholars and professionals in the tourism industry.

1. Introduction

The development of information and communication technologies (ICTs) has transformed the tourism industry, and tourism experiences, worldwide (Tussyadiah, 2016). The use of smartphones, and apps in particular, now impacts on daily life and also has a significant influence on the tourism industry due to the profound effect of these technologies on individual behavior (Gupta, Dogra & George, 2018; Wang, Xiang & Fesenmaier, 2014). According to Hannam, Butler & Paris (2014), the use of smartphones and apps in the context of travel has given rise to radical changes in how tourism is understood and experienced, but also presents a challenge, as they influence tourist satisfaction and have transformed almost all aspects of tourist behavior (Neuhofer, Buhalis & Ladkin, 2014; Wang, 2019; Wang & Fesenmaier, 2013). According to Wang, Park & Fesenmaier (2012), smartphones and apps can help tourists before, during, and after their trip. Lamsfus, Wang, Alzua-Sorzabal & Xiang (2015) contend that smartphones enable consumers to constantly adjust their tourism activities, moment-by-moment, and help tourists coordinate those activities. Therefore, apps now form an integral part of the customer experience, with tourists using them: as online travel agencies (eDreams, Ryanair, Kayak, Hopper, TripIt, Tripwolf, ViajerosPiratas, Trip, or minube); to search and book transport (Uber, Iberia, Lufthansa, Wallet Passes); to book accommodation (Booking, Airbnb, Hostelworld,

Worldpackers); to book leisure, activities, and restaurants (Tripadvisor, Civitatis); as destination guides (Lonely Planet, National Geographic); and for other purposes such as translation (Duolingo, Google Translate) or maps and geolocation (Google Maps, Foursquare, Here). Authors including Wang, Xiang & Fesenmaier (2016) argue that, as a result of the widespread use of tourist apps, travel has become more extensive and tourism activities are now more flexible and also simpler. Moreover, travel apps have reduced the stress involved in planning and consuming tourism and have increased feelings of safety and confidence among travelers. All of these developments have contributed to enhancing the value of travel as they enable consumers to plan, change, and share activities with others during the trip. Increasingly, travelers are looking for authentic situations that connect them with the place they are visiting and help them immerse themselves in the local culture. They also look for opportunities to interact with local people and to distance themselves from the typical clichés that characterize overly touristic places, restaurants, or situations (Kim, Lee & Preis, 2020; Tussyadiah & Pesonen, 2016). Therefore, the tourist of today seeks more experiences, surprises and memorable moments, and smartphones and apps help to achieve just that. User satisfaction with apps is increasing as a consequence. However, despite the change brought about in the tourism industry due to the extensive use of travel apps, and despite their high degree of relevance for this industry, few academic studies have been

conducted to better understand this relationship (Gupta et al., 2018; Law, Chan & Wang, 2018).

Given that apps are a technology, their adoption and use are affected by the culture of origin of users (Hoehle, Zhang & Venkatesh, 2015; Jung, Lee, Chung & tom Dieck, 2018; Lee, Chung & Jung, 2015; Tam & Oliveira, 2019). For example, cultural differences can constitute a barrier to technology-transfer (Lee, Trimi & Kim, 2013) and to the process of acceptance of information technology (IT) (Erumban & De Jong, 2006; Khan & Cox, 2017). As a society's culture influences all aspects of the behavior of the individuals that comprise it (De Mooij & Hofstede, 2011), people who grow up in different countries with different cultural norms develop different ways of behaving and thinking (Hofstede, Hofstede & Minkov, 2010). Understanding why some individuals adapt more effectively to culturally-different contexts has become a primary objective with important implications for international relations, the international economy, education, selection of personnel and the prevention of social conflict (Leung, Ang & Tan, 2014; Ott & Michailova, 2018). Against this backdrop, cultural intelligence (CQ) has been identified as a skill that enables individuals to effectively manage the differences between cultures, meaning that those who possess a high CQ are more adaptable and more able to cope well in cultural environments other than their own (Ang & Van Dyne, 2015). However, despite the acknowledged importance of CQ (Sharma & Hussain, 2017), there are no studies, to date, that have linked it to technology, with the exception of the study by Coves-Martínez, Sabiote-Ortiz & Rey-Pino (2018) that links CQ to Internet use. As a person's CQ acts as a source of motivation and proactivity to interact effectively with other cultures (Ang & Van Dyne, 2015) and acquire greater knowledge and understanding of the environment and context of the place they are visiting, culturally-intelligent individuals will actively seek more intercultural experiences (Ng, Van Dyne & Ang, 2012). They will therefore be better placed to take full advantage of the resources and experiences that a particular destination can provide and will also be more satisfied with it. Studies dealing with CQ have mainly focused on analyzing individuals' fit with other cultures, while there are very few works examining the influence of CQ on consumers' perceptions of services, and even fewer in the tourism industry context (Frías-Jamilena, Sabiote-Ortiz, Martín-Santana, & Beerli-Palacio, 2018a,b). Furthermore, the effect of CQ on satisfaction with the tourism experience has not been demonstrated by the extant literature.

User satisfaction with technology is known to be an important predictor of the intention to use IT (Choi, Wang & sparks, 2019; Liu et al., 2020; Franque, Oliveira, Tam & Santini, 2020). User satisfaction with technology is also an important determinant of consumer behavior variables including loyalty (Zhao, Chen & Wang, 2016) and overall customer satisfaction (Aaltonen, Markowski & Kirchner, 2012; Wang, So & Sparks, 2017). While scholars have demonstrated the important role of consumer satisfaction, there are no quantitative studies analyzing whether satisfaction with an app can influence user satisfaction with the tourism experience or the destination visited. Some authors, such as Law et al. (2018), call for tourism research dealing with mobile technologies from the consumer perspective, on key issues such as satisfaction. Furthermore, in light of the importance of international tourism for the globalized world in which we live, research into concepts such as CQ is essential as it contributes to citizens' ability to adapt to different cultural settings (Ang & Van Dyne, 2015; Thomas & Inkson, 2017).

The aim of the present study, therefore, is to propose and validate a model that positions CQ as an antecedent of satisfaction with the app and satisfaction with the tourism experience. The study seeks to: 1) determine the influence of CQ on user satisfaction with a travel app; 2) analyze how CQ influences satisfaction with the tourism experience; and 3) establish how satisfaction with the travel app influences satisfaction with the tourism experience after using the app. The present research contributes to the study of the CQ deepening the application of this concept in the tourism industry from the perspective of the tourist. The influence of CQ on satisfaction with the travel app and with the tourism experience denotes the importance of considering CQ in the management of tourist destinations. Becoming a determining factor to be taken into account by tourism service providers.

2. Literature review

2.1. Cultural intelligence

In the early 2000s, Earley & Ang (2003) highlighted the importance of the concept of cultural intelligence (measured as Cultural Quotient or CQ). These authors defined CQ as the ability to adapt to culturally-different environments and contexts and to be able to function effectively in various cultural settings (Ang & Van Dyne, 2015; Earley & Ang, 2003; Thomas & Inkson, 2017; Van Dyne et al., 2012). CQ is a multidimensional construct comprising four factors: metacognitive, cognitive, motivational and behavioral. Each of these factors relates to a specific capacity that helps individuals to handle intercultural situations. The first of the four factors, metacognitive CQ, refers to the level of cultural awareness an individual possesses during a cross-cultural interaction (Earley & Ang, 2003). Individuals with a high metacognitive factor consciously question their own cultural assumptions that are reflected during interactions and adjust their own knowledge to that of other cultures. This facilitates the development of new heuristic and social interaction norms in unfamiliar cultural environments by promoting the processing of information at a deeper level (Earley & Ang, 2003). The second factor, cognitive CQ, refers to an individual's knowledge of cultural norms, values, belief, practices, customs and taboos in different cultural settings, which they have acquired from educational and personal experiences (Ang et al., 2007; Ang & Van Dyne, 2015). Individuals with a high cognitive factor are more readily able to interact with people from a culturally-different society by understanding fundamental aspects of it (Earley, 2002). Third, motivational CQ is the ability to channel attention and energy to learn and function effectively in situations characterized by cultural differences (Ang & Van Dyne, 2015). The motivational factor is fundamental as it is a source of proactivity that increases the effort an individual invests in operating in new cultural environments, which can generate stress (Ang & Van Dyne, 2015; Earley & Ang, 2003). People with high motivational CQ are attracted to intercultural situations because they value the benefits of such interactions and are confident they can cope with the challenges inherent in cultural differences (Van Dyne et al., 2012). Finally, behavioral CQ is the behavioral culmination of the other factors, as it reflects one's ability to exhibit appropriate behaviors towards people from diverse cultures (Ang & Van Dyne, 2015; MacNab & Worthley, 2012). Consequently, individuals with a high behavioral factor are flexible and can adjust their behaviors to the specific characteristics of each cultural interaction (Bücker, Furrer, Poutsma & Buyens, 2014). However, although each of these factors measures a different aspect of CQ, an individual who is truly culturally intelligent will possess all four facets of CQ rather than excelling in one particular facet (Ang & Van Dyne, 2015; Earley & Peterson, 2004). In other words, for someone to present a high level of behavioral CQ, they must also have a high cognitive or motivational factor because, to act effectively in culturally-diverse situations, they must understand the culture and its characteristics as norms or expressions linked to cognitive intelligence and must also be motivated to achieve a goal in the form of an appropriate response to a foreign cultural environment (Kanfer & Heggestad, 1997). For example, if an individual possesses cognitive CQ, they must also have a high metacognitive factor, since the latter is responsible for the processes that control cognition (Ang & Van Dyne, 2015). The four factors of CQ, then, are interrelated with each other. The work of Kanfer & Heggestad (1997: 39) corroborates this, arguing that motivational skills "provide agentic control of affect, cognition, and behavior that facilitate goal accomplishment."

Therefore, the importance of CQ is reflected in the fact that it is a skill that enables individuals to adjust to situations and environments beyond

their culture of origin as a result of their personal experience and learning (Şahin, Gurbuz & Köksal, 2014). Studies published to date demonstrate that CQ predicts a variety of important responses in cross-cultural contexts, such as cultural adaptation, expatriate performance, global leadership, intercultural negotiation, and multicultural team processes (Van Dyne et al., 2012). Regarding its capacity to predict cultural adaptation, this positive relationship has been demonstrated in various fields. In the tourism context, it has been shown to influence perceived value (Frías-Jamilena et al., 2018a), hotel customer satisfaction (Lam, Cheung & Lugosi, 2020), customer-based destination brand equity (Frías-Jamilena, Sabiote-Ortiz, Martín-Santana, & Beerli-Palacio, 2018b), service quality (Alshaibani & Bakir, 2017) and the strategy-formulation process in the hotel industry (Ljubica & Dulcic, 2012). It has also been observed that the CQ has a significant influence on tourism industry employees in aspects such as education and training (Bobanovic & Grzinic, 2019; Kamal & Jacob, 2019; Lee, Crawford, Weber & Dennison, 2018) or job performance (Suthatorn & Charoensukmongkol, 2018; Teimouri, Hoojaghan, Jenab & Khoury, 2015). Turning to the technological context, to the best of our knowledge there is only one published study that analyzes the effect of CQ in relation to technology (Coves-Martínez et al., 2018), and there is also literature that demonstrates that individuals with a high CQ possess characteristics such as flexibility, autonomy, and amenity to risk (Ang & Van Dyne, 2015). These characteristics have been found to be linked to greater technological acceptance (Coves-Martínez et al., 2018). Table 1

Table 1
Applications of CQ.

Applications/outcomes	Authors/studies
Cross-cultural adjustment and adaptation	Ang et al. (2007); Chen, Wu & Bian (2014); Chua, Morris & Mor (2012); Elenkov & Manev (2009); Groves, Feyerherm & Gu (2015); Huff, Song & Gresch (2014); Imai & Gelfand (2010); Kim & Van Dyne (2012); Lee, Veasna & Sukoko (2014); Lin, Chen & Song (2012); Malek & Budhwar (2013); Nunes, Felix & Prates (2017); Peng, Van Dyne & Oh (2015); Ramalu, Rose, Kumar & Uli (2010); Templer, Tay & Chandrasekar (2006); Wang (2016); Ward & Fisher (2008); Ward, Wilson & Fischer (2011); Zhang (2013)
Human Resources and work adjustment	Bücker et al. (2014); Chen (2015); Chen, Kirkman, Kim, Farh & Tangirala (2010); Cox (2019); Deng & Gibson (2009); Earley & Peterson (2004); Erez et al. (2013); Firth, Chen, Kirkman & Kim (2014); Flaherty (2015); Groves & Feyerherm (2011); Henderson, Stackman & Lindekilde (2018); Korzilius, Bücker & Beerlage (2017); Kurpis & Hunter (2017); Lee & Sukoco (2010); Lee, Veasna & Wu (2013); Lee, Masuda, Fu & Reiche (2018); Lorenz, Ramsey & Richey (2018); Malek & Budhwar (2013); Mao & Shen (2015); Moon, Choi & Jung (2012); Rockstuhl & Ng (2008); Rahimaghaee & Mozdbar (2017); Ramalu, Rose,Uli & Kumar (2012); Rockstuhl, Seiler, Ang, Van Dyne & Annen (2011); Shaffer & Miller (2008); Vlajčić, Caputo, Marzi & Babic (2019).
Learning and education	Earley & Peterson (2004); Eisenberg et al. (2013); Erez et al. (2013); Goh, 2012; Kang, Kim & Park (2019); Li, Mobley & Kelly (2013); Lin & Shen (2020); MacNab (2012); Lenartowicz, Johnson & Konopaske (2014); MacNab, Brislin & Worthley (2012); Mor, Morris & Joh (2013); Mosakowski, Calic & Earley (2013); Ng, Van Dyne & Ang (2009a, b); Pless, Maak & Stahl (2011); Ramsey & Lorenz (2016); Rosenblatt, Worthley & McNab (2013); Suthatorn & Charoensukmongkol (2018).
Tourism	Alshaibani & Bakir (2017); Arora & Rohmetra (2010); Bobanovic & Grzinic (2019); Frías-Jamilena et al. (2018a); Frías-Jamilena et al. (2018b); Kamal Abdien & Jacob (2019); Lam et al. (2020); Lee, Crawford, Weber & Dennison (2018); Ljubica & Dulcic (2012); Sheehan, Vargas-Sanchez, Presenza & Abbate, 2016; Teimouri et al. (2015).
Technology acceptance	Coves-Martínez et al. (2018)

summarizes the authors of studies dealing with CQ to date and their sphere of application. The following gaps in the literature can be observed: 1) the relationship between CQ and technology is under-studied and 2) most of the extant studies on tourism approach the issue of CQ solely from the perspective of the service provider, not from that of the tourist. Therefore, there is a need for further analysis of the effects of CQ on consumer behavior in the contexts of tourism and technology.

2.2. The effect of CQ on satisfaction with a travel app

From a marketing perspective, consumer satisfaction is a fundamental concept (Hsiao, Chang & Tang, 2016; Nascimiento, Oliveira & Tam, 2018) that can be considered a general evaluation of a product or service based on the overall purchase and consumption experience of the brand in question over time (Flint, Blocker & Boutin, 2011; Hui, Wan & Ho, 2007; Meyer & Schwager, 2007; Qi, Zhou, Chen & Qu, 2012; Wang & Shieh, 2006). Marketing scholars have developed different theories approaching satisfaction as a determinant of individual behavior, including expectation confirmation theory (Oliver, 1980), satisfaction theory (Locke, 1969) or the theory of cognitive dissonance (Festinger, 1962), among others. In the tourism industry, "satisfaction is considered the cognitive–affective state of a tourist derived from their experience in the destination" (Del Bosque & San Martín, 2008, p. 3); or it can be defined as the general satisfaction that captures a tourist's evaluation of their entire travel experience (Lou, Tian & Koh, 2017). In the technology context, we can consider user satisfaction to be "the summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience" (Oliver, 1981, p. 29). This is related to the cognitive assessment of the discrepancy between expectations and performance, which can result in a positive or negative feeling or indifference toward the technology in question (Bhattacherjee, 2001a). More recently, in the literature dealing with apps, authors including Chang (2015: 3), define customer satisfaction as "the total consumption perception of consumers when using mobile apps", this being influenced by components such as utility, hedonism or social factors.

Research into user satisfaction has become a dominant concern in the literature dealing with information systems (IS) and marketing (Hsiao et al., 2016). Satisfaction is identified as a key factor in fostering customer loyalty and being able to build and retain a long-term consumer base (Hsiao et al., 2016; Nascimiento et al., 2018). Authors such as Delone & McLean (2003) contend that user satisfaction is a critical factor to be taken into account when researching technology use. Therefore, the success of IT (including apps) is measured and evaluated via user satisfaction (Montesdioca & Maçada, 2015). That said, the customer's perception of what constitutes good service quality and satisfaction is inextricably linked to culture (Zeithaml, Bitner & Gremler, 2017). When the customer's expectations are not met, this discrepancy can trigger emotions such as disappointment, fear, and loneliness, which can lead to cultural conflicts (Weiermair, 2000). In the same vein, Stauss & Mang (1999) argue that one of the main problems associated with cultural differences is that expectations of customers and suppliers may not be fulfilled, because the performance or behavior of the supplier and the customer differs from what was expected. In the tourism context, CQ mitigates this problem both for suppliers and tourists as it helps the two parties adapt to, and resolve, the challenging issues that can arise between different cultures. Thus, a tourist with a high CQ will be able to understand and act effectively in a foreign environment and will be in a better position to manage their expectations. Therefore, they could be more satisfied with their experiences. There is no literature, to date, that relates CQ to technology satisfaction or, specifically, satisfaction with apps. However, the ability to determine the CQ of tourists could help increase their level of satisfaction with the use of a travel app.

The literature shows that CQ enhances the use of travel apps during the tourist experience and enables the traveler to exploit the app to its

fullest potential. This is due to the fact that some of the particular traits associated with CQ, such as behavioral flexibility, motivation, performance, and adaptation to unfamiliar cultural environments (Ang & Van Dyne, 2015; Earley & Ang, 2003; Van Dyne et al., 2012) influence and enhance the characteristics of a travel app—such as productivity, efficiency, communication, and social interaction (Dickinson et al., 2014; Wang & Fesenmaier, 2013; Wang et al., 2012) (Table 2). These characteristics associated with CQ would also influence and enhance the utility of travel apps, for example in obtaining information about a destination or searching for new experiences (Kennedy-Eden & Gretzel, 2012; Wang et al., 2014, 2016; Wang & Fesenmaier, 2013) (Table 3). This suggests that tourists' CQ may maximize the opportunities offered by travel apps and therefore increase satisfaction with them.

CQ has also been found to improve the management skills and people skills of individuals on a global scale and it has clear repercussions in terms of motivation, leadership, productivity, authority, and satisfaction, among other aspects (Schlägel & Sarstedt, 2016; Vlajčić, Caputo, Marzi & Dabić, 2019). It is for this reason that managers, employees and providers of tourism services endeavor to adapt to, and empathize with, tourists from other cultures who have different values, attitudes, beliefs or perceptions, seeking to overcome barriers and cultural differences that may affect satisfaction with the service. This points to the vital importance of CQ, for example in the hotel industry (Arora & Rohmetra, 2010; Heo, Jogaratnam & Buchanan, 2004; Lam et al., 2020; Ljubica & Dulcic, 2012; Teimouri et al., 2015). Based on this premise, it seems reasonable to expect that tourist satisfaction with the app used during the tourism experience is influenced by their CQ. The following research hypothesis is therefore proposed:

H1. CQ has a positive and significant influence on satisfaction with the travel app.

2.3. The effect of CQ on satisfaction with the tourism experience

Tourist satisfaction is an important success factor in tourism or destination marketing (Chi & Qu, 2008; Della Corte, Sciarelli and Cascella, 2015; Prayag & Ryan, 2012). Satisfaction, too, is affected by

Table 2
Relationship between the characteristics of the travel app and CQ.

Characteristics of the travel app (Dickinson et al., 2014; Wang & Fesenmaier, 2013; Wang et al., 2012)	Relationship to CQ
Productivity and efficiency	With apps, a tourist can enjoy connectivity at any time and in any place (ubiquity), which facilitates the completion of tasks, enriches the tourist experience and increases productivity on a trip. Tourist CQ maximizes and enhances these app benefits, since, as Van Dyne et al. (2012) conclude, the achievement of goals, self-confidence, the search for rewards and incentives, and functioning effectively in a cultural environment are characteristics of a high CQ.
Communication and social interaction	Travel apps increase the scope for communication and interaction with other tourists and the people local to the destination visited. This will be further enhanced by CQ, as this brings with it an inherent interest in experiencing different cultures and interacting with culturally-different others (Van Dyne et al., 2012). Furthermore, the ability to display a flexible range of behaviors is essential for creating positive impressions and the development of intercultural relationships (Ang et al., 2007; Ang & Van Dyne, 2015).

Table 3
Relationship between the uses of the travel app and CQ.

Uses of the travel app (Kennedy-Eden & Gretzel, 2012; Wang & Fesenmaier, 2013, Wang et al., 2014, Wang et al., 2016)	Relationship to CQ
Information about a destination	CQ is linked to the knowledge of universal elements that make up other cultures, such as history, norms or values (Ang et al., 2007). Therefore, a tool such as an app that provides accurate, personalized and high-quality information about a destination will be very useful to individuals with high CQ, who will exploit its potential to the fullest during their trip.
Search for new experiences and innovation	Tourists look for authentic situations that connect them with the place they are visiting and help them to immerse themselves and interact with local individuals and culture, taking them away from the clichés of overly-touristic places or situations (Grayson & Martinec, 2004; Kim, Kang, Song & Lee, 2020; Pine & Gilmore, 2011; Tussyadiah & Pesonen, 2016). Apps help with the latter, and individuals with CQ will get the most out of this technology as they are more motivated and seek more authentic cross-cultural experiences (Ng et al., 2012).

culture (Huang & Crotts, 2019; Wang So and Sparks, 2017), hence behaviors related to the tourism experience are strongly influenced by the culture of origin of tourists (Manrai & Manrai, 2011). It can be inferred, then, that culture is a determining factor in tourist preference and choice (Huang & Crotts, 2019). At the same time, these cultural differences between customers also influence tourism service providers, since they can give rise to discrepancies in key aspects such as quality, due to consumers' perceptions differing according to their culture of origin (Bharwani & Jauhari, 2013; Zeithaml et al., 2017). In the tourism field, authors such as Arora & Rohmetra (2012) have concluded that employee CQ significantly influences the satisfaction of hotel guests because, as noted earlier, CQ is a capacity that enables individuals to adjust to, and interact appropriately with, individuals from other cultures, thereby avoiding problems of perception of the quality of customer service derived from cultural differences. Other scholars, including Lam et al. (2020), also conclude that the CQ of a hotel's suppliers and employees significantly influences tourist satisfaction with hotel services. Taking this into account, CQ appears to facilitate the development of individuals' understanding of cultural context and their planning and interpretation of situations in diverse cultural settings (Ang et al., 2007). The effect of tourist CQ on key variables of consumer behavior, such as perceived value (Frías-Jamilena et al., 2018a) or customer-based destination brand equity (Frías-Jamilena et al., 2018b) has also been demonstrated. CQ enables individuals to accommodate cultural differences and adopt appropriate behaviors in culturally-diverse settings (Chen et al., 2014). Van Dyne, Ang & Livermore (2010) find that the metacognitive aspect of CQ provides a link between an understanding of the cultural aspects of different countries and its application to intercultural interactions. In the tourism industry, this is a crucial point since it allows tourists to step back from their own cultural context and empathize with the environment they are visiting. Therefore, it is to be expected that, the greater the tourist's ability to understand cultural differences, the better their adjustment to the environment, and that this will have a positive impact on their satisfaction with the tourism experience. Furthermore, the cognitive aspect of CQ encompasses the individual's knowledge of the values, universal elements, norms and beliefs of a culture (Earley & Ang, 2003). Thus, CQ

will help increase tourists' satisfaction with their travel experience, as it will enable them to better understand the environment and context of the destination they are visiting. In turn, CQ is a source of motivation and proactivity to interact effectively with other cultures (Ang & Van Dyne, 2015). According to Ng et al. (2012), culturally-intelligent individuals will seek more intercultural experiences. It is also logical to expect, therefore, that a tourist with a relatively high level of CQ will present a higher level of ability to empathize with other cultures and be in a better position to take full advantage of the resources and experiences that a given destination has to offer. As Wang et al. (2012) contend, the more experiences, surprises and memorable moments a tourist has, the greater their satisfaction will be. CQ helps to promote such experiences as it enables the tourist to act appropriately and interact more effectively in the unfamiliar surroundings of the place they are visiting. Given these findings, high tourist CQ presents as understanding, knowledge, motivation and proactivity, as well as a greater of ability to empathize with other cultures—all of which enable the tourist to derive the maximum benefit from their trip and, in all likelihood, greater satisfaction with the tourism experience. However, there are no previous studies examining the influence of CQ on satisfaction with the tourism experience. In the present research, the following hypothesis is therefore proposed:

H2. CQ has a positive and significant influence on satisfaction with the tourism experience.

2.4. The effect of satisfaction with the app on satisfaction with the tourism experience

Consumer satisfaction has been widely studied and validated empirically in different technological contexts, acting as an important predictor of IT use (Hsiao et al., 2016; Xu, Peak & Prybutok, 2015) and is the ultimate objective of any technology provider (Bhattacherjee, 2001a, b; Mouakket & Bettayeb, 2015; Thong, Hong & Tam, 2006; Zhao & Lu, 2012; Lin, Fan & Chau, 2014). More satisfied users tend to have a stronger intention to use a technology (Thong et al., 2006). Satisfaction is also a determinant of loyalty to social networks (Zhao et al., 2016) or to mobile messaging services (Zhou & Lu, 2011). Its influence has been studied in areas such as e-learning (Cheng, 2014; Roca, Chiu & Martinez, 2006; Terzis, Moridis & Economides, 2013), Internet use (Hong, Thong & Tam, 2006; Kang, Hong & Lee, 2009; Limayem, Hirt & Cheung, 2007; Lin, Wu & Tsai, 2005), electronic commerce (Bhattacherjee, 2001b; Hung, Chen & Huang, 2014; Sabiote-Ortiz, Frías-Jamilena & Castañeda-García, 2012), use of mobile data (Deng, Turner, Gehling & Prince, 2010; Thong et al., 2006), social networks (Chang & Zhu, 2012; Jin, Lee & Cheung, 2010), use of smartwatches (Nascimiento et al., 2018), use of IS (Hong, Thong & Chasalow, 2011), mobile banking (Foroughi, Iranmanesh & Hyun, 2019) and apps (Hsiao et al., 2016; Lee, Tsao & Chang, 2015; LLu, Liu & Wei, 2017; Tam, Santos & Oliveira, 2020; Wang, 2019; Xu et al., 2015), among others. It has also been observed that satisfaction with a technology has a positive influence on overall customer satisfaction. For example, Aaltonen et al. (2012) found that satisfaction with banking technology influences overall customer satisfaction with the bank. In the tourism industry context, Castañeda-García, Frías-Jamilena & Perez-Rodríguez (2007) studied the relationship between satisfaction with the search for holiday-related information offered by all tourism entities on the Internet and destination satisfaction. Wang et al. (2017) found a positive relationship between satisfaction with airline service technology and the traveler's satisfaction with the general experience of the flight. However, despite the literature on the effect of satisfaction with a technology, there are very few studies that focus on satisfaction with an app, and even fewer dealing with apps that help tourists with their traveling experience. Authors such as Lou et al. (2017) demonstrate the influence of the use of QR codes to make payments on trip satisfaction. Kim, Kang, Song & Lee (2020)corroborated the influence of values such as the aesthetics and service excellence of a hotel app on

customer satisfaction. Wang et al. (2012) and Mang, Piper & Brown (2016) assert that the use of smartphones and apps increases tourist satisfaction, while Tan & Lu (2019) also demonstrate that the use of a travel app increases trip satisfaction. This is because apps help tourists to be more creative and spontaneous during the trip, which is reflected in an improvement in their satisfaction. Therefore, if a user is pleased with what the app offers, it has a positive effect on their satisfaction. It follows, then, that, since the apps are adapted and customized to individual preferences, the user can better prepare for the trip, sightsee in the places most of interest to them, and experience restaurants or activities that they would otherwise not have heard about. Equally important is the social aspect of sharing the experience via the app with other users and also being able to observe their comments. This feature is perhaps more important than ever before, given that today's tourists want to live unique and authentic experiences and are no longer interested in acquiring an off-the-shelf tourism product or service (Della Corte, Sciarelli, Cascella & Del Gaudio, 2015). It is therefore to be expected that, if tourists are satisfied with the app, this may positively influence their satisfaction with the tourism experience, as the app provides tools and information with which to enjoy and get the most out of a trip. This influence can occur before, during, and after the trip (Wang et al., 2017). Despite the importance of this relationship, there are no previous studies analyzing the possible influence of satisfaction with a travel app on satisfaction with the tourism experience. The following research hypothesis is therefore proposed:

H3. Satisfaction with the travel app has a positive and significant influence on satisfaction with the tourism experience.

Fig. 1 sets out the research model.

3. Methodology

3.1. Sample design and data-collection

The sample comprised Spanish tourists who used a travel app during their trip. Participants were selected via an Internet user panel managed by Dynata. This firm is the world's largest first-party data company, with a global reach of more than 62 million consumers and business professionals, with billions of verified data points. The panel has more than 300,000 users in Spain. By controlling its characteristics, Dynata created a consistent online sample as measured and compared against external benchmarks.

The final sample for the present study comprised 243 valid responses to our questionnaire. The fieldwork was conducted in November 2019, the questionnaire being self-administered and organized by the Dynata online panel. The sociodemographic characteristics of the simple are shown in Table 4.
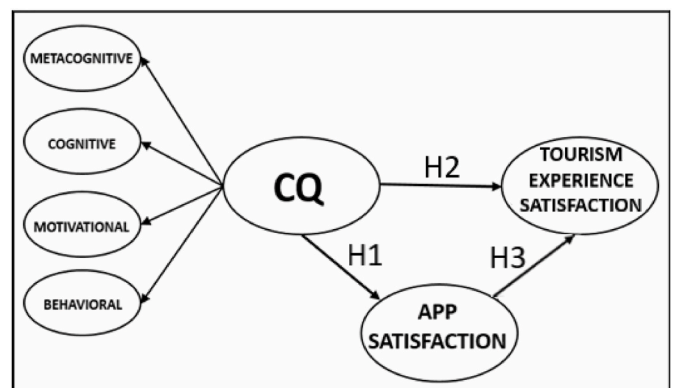

Fig. 1. Research model.

Table 4
Sociodemographic characteristics of the sample.

Characteristics	Category	Percentage
Gender	Male	51.85
	Female	48.15
Age	18 to 24	8.64
	25 to 34	22.63
	35 to 44	38.27
	45 to 54	20.16
	55 to 64	7.82
	65 to 74	2.48
Level of education	Pre-university studies	37.86
	University studies	62.14
Employment status	Employed,	84.78
	Unemployed	3.29
	Other	11.93
Monthly income	Less than €999	5.76
	€1000–€1499	16.87
	€1500–€2499	33.74
	€2500–€3499	26.75
	€3500 or more	16.88
	Alone	5.76
Typically travels …	With their partner	67.49
	With others	26.75

3.2. Measurement scales

Based on the literature review, we identified the scales to measure the variables included in the research (Appendix 1). Satisfaction with the travel app consisted of four items adapted from the scale developed by Xu et al. (2015), based on previous research on technological satisfaction (Bhattacherjee, 2001a, b) and consumer satisfaction (Oliver, 1980; Spreng, MacKenzie & Olshavsky, 1996). Satisfaction with the tourism experience was also measured on a 4-item scale that we adapted from Kim, Woo & Uysal (2015) and originally derived from previous studies of tourist satisfaction with the destination and with the tourism experience (Lee, Trimi & Kim, 2013; Neal, Uysal, & Sirgy, 2007; Yoon & Uysal, 2005).

CQ was measured using the scale by Ang et al. (2007) adapted by Frías-Jamilena et al. (2018a) for the tourism industry. This scale consists of 12 items that capture the four components of CQ. Each item on the scale describes an individual's ability to be culturally intelligent in each of the four factors (metacognitive, cognitive, motivational, and

behavioral). A high score on the scale indicates a high CQ. CQ has been validated for different samples at different times and for different countries (Bücker, Furrer & Lin, 2015; Keung & Rockinson-Szapkiw, 2013; Rockstuhl & Van Dyne, 2018) All measurements were made on 7-point Likert scales, where 1 indicated "entirely disagree" and 7 "entirely agree".

4. Results

4.1. Analysis of the validity of the measurement scales

Prior to testing the hypotheses, we validated the scales on satisfaction with the app, satisfaction with the tourism experience, and CQ using confirmatory factor analysis (CFA). We used the maximum likelihood estimation method (MLM) as the sample did not follow a normal distribution (Bollen, 1989). CQ is defined as a latent construct that comprises four dimensions or factors: metacognitive, cognitive, motivational and behavioral. Following the approach recommended by Anderson & Gerbing (1988), as can be seen in Table 5, the model showed an acceptable level of individual reliability, given that the relationship between each item and its respective dimension was statistically significant and the standardized loads were greater than 0.5. Regarding internal consistency, the composite reliability (CR) values of the CQ dimensions were greater than 0.70, those of the variance extracted (AVE) greater than 0.50, and the Cronbach's alpha greater than 0.6 (Hair, Black, Babin & Anderson, 2018). These results indicate that the measurement model is reliable.

We also confirmed that CQ is a multidimensional second-order construct comprising the four dimensions identified in the literature. Of these, the motivational and cognitive dimensions have the greatest impact on the configuration of CQ, followed by cognitive and behavioral dimensions, according to their standardized coefficients I (0.914, 0.869, 0.676, and 0.616, respectively). Regarding the scales for satisfaction with the travel app [CR = 0.94, AVE = 0.80, α = 0.94] and satisfaction with the tourism experience [CR = 0.94, AVE = 0.80, α = 0.94], as can be seen in Table 5, the values of the reliability indicators are within those recommended by the literature (Hair et al., 2018). It was therefore confirmed that the model has a good measurement fit.

We also tested the discriminant validity of the CQ scale. This is obtained if the correlations between its dimensions are less than the square root of the average variance extracted (AVE) of each one. In Table 6, the

Table 5
Confirmatory factor analysis.

		Causal relationships	Standardized estimators	z	p	Cronbach's alpha	CR	AVE
Metacognitive	<—	CQ	0.87					
Cognitive	<–	CQ	0.68	9.12	0.00	0.855	0.857	0.606
Motivational	<—	CQ	0.91	10.56	0.00			
Behavioral	<—	CQ	0.62	7.19	0.00			
MET1	<—	Metacognitive	0.90					
MET2	<—	Metacognitive	0.87	15.84	0.00	0.876	0.880	0.787
COG1	<—	Cognitive	0.87					
COG2	<—	Cognitive	0.87	15.88	0.00	0.879	0.878	0.707
COG3	<—	Cognitive	0.78	12.92	0.00			
MOT1	<—	Motivational	0.80					
MOT2	<—	Motivational	0.86	14.86	0.00	0.915	0.916	0.687
MOT3	<—	Motivational	0.86	14.77	0.00			
MOT4	<—	Motivational	0.85	13.42	0.00			
MOT5	<—	Motivational	0.76	11.90	0.00			
BE1	<—	Behavioral	0.86					
BE2	<—	Behavioral	0.91	11.68	0.00	0.877	0.877	0.781
APPSATISF1	<—	App satisfaction	0.89					
APPSATISF2	<—	App satisfaction	0.92	18.17	0.00	0.938	0.941	0.800
APPSATISF3	<—	App satisfaction	0.91	17.54	0.00			
APPSATISF4	<—	App satisfaction	0.87	17.28	0.00			
TOUSATISF1	<—	Tourism experience satisfaction	0.88					
TOUSATISF2	<—	Tourism experience satisfaction	0.90	24.37	0.00	0.941	0.942	0.803
TOUSATISF3	<—	Tourism experience satisfaction	0.93	20.15	0.00			
TOUSATISF4	<—	Tourism experience satisfaction	0.88	19.60	0.00			

Table 6
Evaluation of discriminant validity of CQ.

Dimensions	Metacognitive CQ	Cognitive CQ	Motivational CQ	Behavioral CQ
Metacognitive CQ	0.89			
Cognitive CQ	0.527	0.84		
Motivational CQ	0.778	0.672	0.83	
Behavioral CQ	0.443	0.616	0.640	0.88

results of the analyses show that the square roots of all the AVEs are greater than the non-diagonal elements. Therefore, it is confirmed that the CQ scale also has discriminant validity.

4.2. Testing the hypotheses

To test the research hypotheses, the psychometric properties of the proposed model were estimated and evaluated. For this, a structural equation model (SEM) was used (Fig. 1), together with the maximum likelihood estimation method and bootstrapping (Yuan & Hayashi, 2003). According to the recommendations of Hair et al. (2018), we deemed the SEM methodology to be the most appropriate, as the research model includes latent variables that are not directly observable. SEM is a widely-used and tested multivariate analysis technique for this type of test and that brings together methodological techniques that have been refined over time and applied in various scientific fields (Hair et al., 2018). The software used for our data analysis was RStudio 1.3.959. The results of the research model indicated that the fit indices were acceptable [$\chi 2$ (163) = 329.03, p = 0.000; CFI = 0.94; NFI = 0.903; TLI = 0.93; RMSEA = 0.065], as the value of the CFI index is between 0.90 and 0.95, the NFI and the TLI present values greater than 0.9, and the RMSEA is not greater than 0.08 (Hair et al., 2018; Mathieu & Taylor, 2006). The results of the analyses (Table 7) show that: (1) CQ is an antecedent of satisfaction with a travel app, with a direct, positive and significant effect (β = 0.69, p = 0.00), hence, H1 receives empirical support; (2) CQ exerts a direct, positive and significant effect on satisfaction with the tourism experience (β = 0.47, p = 0.00), hence, H2 also receives empirical support; and (3) satisfaction with the travel app has a direct, positive and significant effect on satisfaction with the tourism experience (β = 0.40, p = 0.00), with H3 therefore also obtaining empirical support (see Table 7).

5. Discussion of the results, conclusions and implications

According to Digital 2020: Global digital yearbook Hootsuite (2020), the number of smartphone users in 2020 rose to more than half of the world population. An average adult spends more than 4 h a day using their smartphone, along with related apps for social networking and communications. This represents a cultural shift in the use of technology (Hacker Noon, 2017). Furthermore, the use of smartphones has dramatically changed behaviors and business processes in the field of tourism, transforming the meaning of travel (Wang et al., 2012). The importance of conducting research such as the present study is thus underlined, as it studies the relationship between tourists and app technology.

Considering both the importance of ICT and CQ, the present study makes several contributions to the literature. First, it contributes to

improving and expanding the study of CQ in the tourism and technological fields as follows: a) we establish an important link between culture and CQ. Culture affects tourist behavior (Manrai & Manrai, 2011) but, unlike most studies, which take a combined or overall perspective (Hofstede et al., 2010), this research advances in the cross-cultural perspective by examining learning and experience at the individual level (Earley & Ang, 2003; Şahin et al., 2014); b) the work adds to the evolution of the CQ literature as it analyses the tourist perspective. Most of the extant studies on CQ in tourism are approached from the point of view of service providers, there being only limited works dealing with the point of view of the tourist (Frías-Jamilena et al., 2018a, b). Second, this study proposes a relationship between CQ and satisfaction with technology. To date, this relationship has been absent from previous studies, with most of the CQ research analyzing the influence of this concept in the cross-cultural field (Ang & Van Dyne, 2015; Earley & Ang, 2003). The results of the present study show that CQ exerts a positive and significant influence on satisfaction with the app used. These findings indicate that the tourist's higher level of CQ enhances their use of a travel app and the benefits they derive from it when visiting a destination, thanks to their characteristics of behavioral flexibility, motivation, performance, and adaptability in foreign cultural environments. These CQ characteristics help increase the utility of the app in terms of the tourist's productivity and efficiency, communication, obtaining information about a destination and searching for new experiences. Users mainly use an app for its productivity and efficiency, to communicate and interact socially or to obtain information about a destination and search for activities and new experiences (Dickinson et al., 2014; Mang et al., 2016). As a result of these enhanced benefits, CQ helps tourists to derive greater satisfaction from the app. Third, the present study demonstrates the influence of tourist CQ on satisfaction with the tourism experience. This influence is due to the fact that CQ is a source of motivation and action for the tourist in diverse cultural settings—an ability that helps them experiment and interact more in the destination, leading to greater satisfaction with it. These results are in line with those obtained for service providers, since most of the previous studies have examined how the CQ of employees in the tourism industry influences customer satisfaction with the tourism service (Arora & Rohmetra, 2012; Lam et al., 2020; Sheehan, Vargas-Sánchez, Presenza & Abbate, 2016; Teimouri et al., 2015). This points to the need for more studies to verify how the customer's CQ influences their behavior.

Finally, this research contributes to the literature by demonstrating the importance of travel apps in improving the experience of tourists in the destination. The extant literature highlights that tourist satisfaction is one of the determinants of success in tourism marketing activities (Chi & Qu, 2008) and that the use of mobile technology is an important factor that also contributes to tourist satisfaction (Mang et al., 2016; Tan & Lu, 2019; Wang et al., 2012). Some authors such as Wang et al. (2017) find that satisfaction with technology positively influences the overall satisfaction of an airline traveler. Our literature review, however, has shown that there is no research linking satisfaction with a technology (such as apps) to satisfaction with the tourism experience. The present study demonstrates that, the greater the satisfaction with the travel app, the greater the satisfaction with the tourism experience. This is because, if a tourist is satisfied with a travel app, this is likely to be because it has opened up different possibilities to them, such as finding more activities and generally improving their experience in the destination, bearing in mind that the services proposed to the user will be personalized. Therefore, if a tourist is satisfied with the app, they will also be satisfied

Table 7
Relationships.

Regressions			Estimate	Std. Err	z-value	P (>|z|)	Std.all
App satisfaction	<-	CQ	0.69	0.09	8.05	0.00	0.61
Tourism experience satisfaction	<-	CQ	0.47	0.10	4.55	0.00	0.43
Tourism experience satisfaction	<-	App Satisfaction	0.40	0.11	3.54	0.00	0.41

with the tourism experience, because the app will have enabled them to get the most out of the trip. This is particularly important, given that use of the app can help today's tourist avoid "standardized" travel experiences and instead discover the more authentic aspects of the destination that create unique experiences (Della Corte et al., 2015).

The results of this study have important implications for the tourism industry. Currently, in a globalized world without barriers, thanks to ICTs (Friedman, 2006), business success will depend on the extent to which suppliers and customers are able to interact and function effectively in different cultural environments (Ang & Van Dyne, 2015). This is especially important in a context such as tourism, where a significant proportion of consumers come from different cultures. Cultural differences can be a barrier to satisfaction that affects tourist perceptions of destination quality, but CQ helps individuals in this process of cultural adaptation. Therefore, CQ should be taken into consideration when studying the tourism industry, also from the perspective of tourists. The influence of CQ on satisfaction with the tourism experience has been identified in the present research as a key relationship, pointing to the importance of considering CQ in the management of tourist destinations. Tourists' CQ is particularly important, since it positively influences their assessment of—and satisfaction with—the tourism experience. This renders CQ a determining factor in destination revisit intention, loyalty, and recommendation. Service providers must understand that CQ motivates tourists to seek new experiences and to empathize with different cultures in the destination they are visiting. Therefore, to increase satisfaction with tourism services, providers should offer experiences and activities that bring the customs, lifestyles and history of the destination closer—unique and exciting experiences that are far from run-of-the-mill. Meanwhile, when dealing with the tourism industry, providers and designers of technologies such as apps must take into account the cultural differences of the users. As reflected in this research, CQ helps enhance the utility and capabilities of an app, which will lead tourists to feel more satisfied with the travel apps they use in their experience. Hence, technology providers must consider elements such as CQ when designing travel apps. Also, other previous studies such as Wang et al. (2012) or Tan & Lu (2019) find that the use of apps influences tourist satisfaction. Therefore, providers must accordingly design quality apps that are useful when traveling because, as reflected in the results of this research, they will have a positive impact on the evaluation of the destination. If a tourist is happy with a travel app, their satisfaction with the tourism experience will increase, and this also positively affects their evaluation of tourism firms.

Finally, the present study has certain limitations that may serve as a starting point for future lines of research. For example, our study only considers the CQ and satisfaction of Spanish tourists. Future research could use samples of tourists of other nationalities who have used travel apps on their trips. It would also be valuable to include other variables in the model that might also influence satisfaction with the app, such as personalization. Tourists want to receive information that is adapted to their needs and tastes regarding the activities at the destination. Therefore, a travel app that can provide users with accurate, personalized information and suggest experiences based specifically on their preferences regarding their trip will generate satisfaction with that app. Another variable that could be included is privacy risk, as authors such as Gupta et al. (2018) have confirmed the negative influence of privacy risk on intention to use travel apps. Therefore, if a tourist perceives their personal data to be at risk due to travel-app use, this could adversely affect satisfaction with this technology and with the tourist experience. A further variable to consider in future research is hedonic motivations, as these have been found to affect satisfaction with the app, as suggested by Xu et al. (2015). Moderator variables such as country of origin or cultural distance could also be considered in the model. This is due to the fact that culture, as reflected in the cultural dimensions, influences both the behavior of tourists in a given society (Huang & Crotts, 2019) and also technology acceptance (Chopdar, Korfiatis, Sivakumar & Lytras, 2018). Therefore, it is anticipated that the cultural dimensions will affect satisfaction with the tourism experience or with the travel app.

Credit author statement

A. L. Coves-Martínez: Conceptualization, Methodology, Writing - Original Draf, Visualization, Investigation, Formal analysis. C. M. Sabiote-Ortiz: Supervision, Data Curation, Writing - Review & Editing, Software, Conceptualization. D. M. Frías-Jamilena: Supervision, Funding acquisition, Writing - Review & Editing, Project administration, Conceptualization.

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Appendix A. Final items for CQ, satisfaction with the travel app and with the tourism experience

CQ	Items
MET1	I am aware that I use my knowledge of other cultures when interacting with local people.
MET2	I can test how much I know about other cultures when interacting with local people.
COG 1	I know the legal and economic systems of other cultures.
COG 2	I know the rules (e.g. vocabulary, grammar etc.) of other languages.
COG 3	I know the cultural values and religious beliefs of other cultures.
MOT 1	I enjoy interacting with people from other cultures.
MOT 2	I am confident I can socialize within the other cultures, which are unfamiliar to me.
MOT 3	I am sure I can deal with any stress associated with adjusting to other cultures, which are new to me.
MOT 4	I enjoy spending time in other cultures, which are unfamiliar to me.
MOT 5	I am sure I can adapt to the living conditions of different cultures.
BE 1	I change my verbal behavior (e.g. accent, tone, etc.) when necessary, when interacting within the other cultures.
BE 2	I change my non-verbal behavior when necessary, when interacting within the other cultures.
Satisfaction with the travel app	
APPSATISF1	I feel very satisfied with the overall experience of using travel Apps.
APPSATISF2	I am very pleased with the overall experience of using travel Apps.
APPSATISF3	I am very contended with the overall experience of using travel Apps.
APPSATISF4	I feel very delighted with the overall experience of using travel Apps.
Satisfaction with the tourism experience	

(continued)

TOUSATISF1	My overall evaluation on the most recent tourism experience is positive.
TOUSATISF2	My overall evaluation on the most recent tourism experience is favorable.
TOUSATISF3	I am satisfied with the most recent tourism experience.
TOUSATISF4	I am pleased with the most recent tourism experience.

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