Smart Tourism Technologies' Ambidexterity: Balancing Tourist's Worries and Novelty Seeking for Travel Satisfaction

Jahyun Goo[1] · C. Derrick Huang[1] · Chul Woo Yoo[1] · Chulmo Koo[2]

Abstract

Tourists deal with two intrinsic, uncertainty-driven attributes of travel, tourist worries and novelty seeking, that simultaneously affect their transaction and travel experience satisfaction. Rapid technological advances coupled with uncertainties caused by momentous events such as COVID-19 highlight the increasing significance of smart technologies in the tourism industry. This study explores the relationships between novelty and worries and travel satisfaction, as well as examines how tourists enhance their quality of trips with the use of smart tourism technologies. We find the tourists' novelty seeking would enhance the trip experience, leading to overall travel satisfaction. In contrast, tourist worries, particularly in trip planning, would negatively affect tourists' transaction satisfaction, which in turn impacts the overall travel experience satisfaction. As a moderator in its ambidextrous role, smart tourism technologies help tourists to develop a sense of novelty when planning and visiting a destination and mitigate the worries emanated from the uncertainty of transaction made during the pre-trip planning. Insights and implications of such findings are discussed for both theory and practice.

1 Introduction

Travel involves the notion of "departure," where people leave their normal place of work and residence for short periods of time for a limited breaking with established routines and practices of everyday life and allowing one's senses to engage with a set of stimuli that contrast with the everyday and the mundane (Urry, 1990). The fact of departure from the relatively certain routine practices to an unfamiliar situation inevitably brings aspects of abnormal, uncertain environment which might otherwise remain opaque. Such uncertainties simultaneously give rise to an intriguing tension between novelty and worry in travel. On one hand, consuming travel goods and services would supposedly generate pleasurable experiences that are different from those typically encountered in everyday life. It speaks to us in ways that we look at the environment with interest and curiosity when we go away or at least as we anticipate doing so. On the other hand, travel, being the departure from familiarity and routines, inevitably causes tourists to worry (Jin et al., 2016; Larsen et al., 2009). In order for travel to happen, for example, purchasing and consumption of goods (e.g., luggage, travel gears and apparels, etc.) and services (flights, hotels, meals, admission tickets, etc.) is necessary. Such transactions are less certain than what people make on a daily basis and represent risks to tourists in the form of potential overpayment, incorrect purchases, ineffective arrangements, and so on. Advancing this view, we posit that travel by nature inevitably puts tourists in a situation where they simultaneously deal with worries and novelty seeking. In other words, while tourists would be worried about uncertainties in trip planning and booking, some level of "unknown" can be interesting for novelty seekers (Kim

✉ Jahyun Goo
   jgoo@fau.edu

   C. Derrick Huang
   dhuang@fau.edu

   Chul Woo Yoo
   yooc@fau.edu

   Chulmo Koo
   helmetgu@khu.ac.kr

[1] College of Business, Florida Atlantic University, Boca Raton, FL, USA

[2] College of Hotel & Tourism Management, Kyung Hee University, Seoul, South Korea

& Kim, 2015; Larsen et al., 2009) as it enriches their travel experience and satisfaction (Prebensen & Xie, 2017).

The literature has long identified and confirmed that these two uncertainty-related issues—tourist worries (Baron et al., 2000; Jin et al., 2016; Larsen et al., 2009) and novelty seeking (Assaker & Hallak, 2013; Jang & Feng, 2007; Kim & Kim, 2015; Toyama & Yamada, 2012)—significantly affect tourists' travel experience and satisfaction. The effort required to balance these two conflicting issues may discount the value of travel experience, as both cognitive and emotional control constitutes subjective costs, biasing choices away from effortful actions (Jin et al., 2016; Larsen et al., 2009). Literature in individual psychology also suggest that facing such conflicting expectations is considered aversive, since recruiting cognitive control to resolve conflict is effortful (cf., Freeston et al., 1994). Therefore, it is important to identify ways tourists can simultaneously address these two intrinsically conflicting, uncertainty-driven attributes of travel, and we posit that information technologies could be used in the contexts of cognitive effort involved in resolving such conflicts. Rapid technological advances coupled with uncertainties caused by momentous events such as COVID-19 highlight the increasing significance of smart technologies in the tourism industry. However, while smart tourism technologies (STT) have served as a key mechanism for managing against risks (Huang et al., 2017; Yoo et al., 2017) and enhancing tourists' experience and satisfaction (Narangajavana Kaosiri et al., 2019; Narangajavana et al., 2017), the specific ways and mechanisms of STT tourists use to cope with these two uncertainty-driven factors simultaneously have not been empirically studied.

To bridge this critical gap, this current study sets out novelty seeking (defined as *the individual's drive to explore contrast between present perception and past experience*) and tourist worries (defined as *the individual's attempt to engage in mental problem-solving regarding tourist trip-related issues where outcomes are thought to be uncertain and contain possibilities for negative results*) as distinct concepts and explicitly explores the relationships between them and travel satisfaction. Specifically, the current study raises the question if the tourists' novelty seeking enhance the trip experience and the travel satisfaction while at the same time tourist worries negatively affect tourists' the overall travel experience and satisfaction.

Furthermore, this study attempts to investigate the facilitating role of smart tourism technologies as travelers deal with worries and novelty simultaneously. To this end, we intend to examine how tourists enhances the travel experience with the STT's ambidexterity, defined as *STT's ability to mitigate worries from uncertainty when arranging and purchasing travel products/services while simultaneously allowing tourists to seek novelty in the trips*. We examine how the STT's ambidexterity takes place in trip satisfaction,

how STT usage can mitigate worries during trip planning online (transaction satisfaction), and how it can encourage tourists to expand the expectations and experiences by seeking novelty and variety (Assaker & Hallak, 2013; Kahn, 1995; Kim & Kim, 2015). To empirically investigate STT's ambidexterity in enriching travel experience and satisfaction, we model STT as a moderator in the relationships between tourists' worries in the travel planning and their travel experiences and between tourists' novelty seeking and their travel experiences.

Using the survey data collected from a travel club in South Korea, we conduct an individual-level study that offers important contributions to the current literature on smart tourism. First, we theorize and empirically confirm that there exists tension between positive and negative concerns in travel emanating from the uncertainty in tourists' interactions with travel goods and services. Tourists attempt to address these uncertainty-driven concerns by using STT in pursuit of their travel satisfaction. This theoretical perspective is particularly appropriate in the era of smart tourism because STT are considered to be a means of facilitating tourist-information interactions (Gretzel et al., 2015; Ho et al., 2015; Werthner & Klein, 1999; Yuan et al., 2019). Second, we specify and examine the moderating roles of STT, yielding insights into potential ambidextrous effects of STT on two uncertainty-driven factors that directly affect individual tourists' travel transaction and travel experience satisfaction. Given that prior research has primarily used the technology adoption perspective to examine the direct influence of STT on travel satisfaction (e.g., Chen & Chou, 2019; Huang et al., 2017; Prebensen & Xie, 2017; Ukpabi & Karjaluoto, 2017), our work contributes to the literature by deepening the understanding of situations under which the STT's ambidexterity process takes place and offers actionable and prescriptive advice to travel agencies and providers regarding the management of tourists' uncertainty with travel.

2 Research Background

2.1 Travel Satisfaction and Smart Tourism Technologies

Smart tourism technologies, or STT, in this study refer to any forms of technologies that are associated with interconnection, synchronization, and concerted use for travel (Gretzel et al., 2015) and can include smartphone apps, websites of online travel agencies, destination smart infrastructure, to name a few. Literature suggests that STT aggregate and harness data derived from physical infrastructure, social connections, government/organizational sources, and human bodies/minds in combination with the use of advanced

technologies to transform tourist's travel experiences. Consistent with the conceptualization by Huang et al. (2017) and Yoo et al. (2017), we view that STT constitute four key attributes—informativeness, accessibility, interactivity and personalization—which tourists leverage for information search, transaction, communication, and content generation so as to enhance the usability and perceived usefulness of the technologies. Studies in smart tourism generally recognize that STT support the travel planning process by providing relevant information and services to users in an interactive manner, thereby facilitating tourist's informed decision that can lead to the enhanced travel satisfaction.

Satisfaction is judgement that a user or consumer makes whether a product or service, in this case a tourism product/service attribute and/or entire trip, offers a reasonable level of fulfillment when consumed (Oliver, 1993). Satisfaction involves a continuing evaluation of a product, service, or an experience, based on the difference between the expected level and the actual level of performance of the product/service/experience (Oliver, 1997). In forming the decision on satisfaction, both cognitions (expectations and performance) and emotions can play a significant role (del Bosque & San Martín, 2008; Oliver, 1993). Extending this concept to the context of this research, we regard travel satisfaction as the perception affected by fulfilling the gap between the expected performance of travel products and services and what a tourist actually experiences on the trip.

Research has found that smart tourism technologies play an important role in travel planning and tourism experience (Gretzel et al., 2015; Koo et al., 2017; Lee et al., 2015). One stream of such research focuses on the influence of STT, which include all forms of online tourism applications, information sources (e.g., online travel agents, personal blogs, public websites, company websites, social media, smartphone apps) and other smart technologies (i.e., artificial intelligence, cloud computing, and Internet of Things), on different aspects of travel such as pre-travel planning, decisions, and purchasing of trips (Jeong & Shin, 2020; Kim et al., 2011; Yoo et al., 2017; Yoo et al., 2009), the expressing of loyalty (Wang et al., 2019), the triggering of electronic work-of-mouth (eWOM) (Luo & Zhong, 2015), customer engagement (Lee et al., 2021), and attitudinal factors (Gretzel et al., 2006; Huang et al., 2017). Recently, smart tourism studies have turned the attention to examining the STT's role in tourists' travel experiences. For example, various studies focus on discovering the relationship between STT and trip expectation (Narangajavana et al., 2017), place experience (Azis et al., 2020; Chung et al., 2017; Tussyadiah & Fesenmaier, 2009), and tourist satisfaction (Narangajavana Kaosiri et al., 2019). In the planning phase, it is theorized that four attributes of online tourism information sources—accessibility, information reliability, interaction, and personalization—are key to planning a trip (No & Kim,

2015). Travelers have found the Internet to be useful for all categories of travel decisions such as the destinations to visit, the locations to stay, and the activities to take on (Xiang et al., 2014). And new media such as social networks and smartphones help travelers to extend the focus of information search for travel decisions from travel products and services to information to improve travel experience (Chung & Koo, 2015; Wang et al., 2012; Xiang & Gretzel, 2010; Xiang et al., 2014).

In addition to the actual experience, travel satisfaction can be influenced by initial expectation and online searching and the arrangements and purchases of travel products and services such as flight, hotels, tours, tickets, etc. when travelers use STT for trip planning (Constantin, 2012; Filieri et al., 2015; Tseng, 2017). Such transactions are a significant part of travelers' engagement in STT as an e-commerce platform for travel products and services, and, as such, we also separately examine "transaction satisfaction" as part of the overall travel experience satisfaction. To define transaction satisfaction in smart tourism, the current study refers to Buhalis's notion of e-tourism that "reflects the digitalization of all processes and value chains in the tourism, travel, hospitality and catering industries" (2003, p. 6). Based on this notion, forming satisfaction judgment for using STT for travel planning and transactions involves not only the purchasing and browsing experience on the e-tourism sites at the time of transactions but also the stages preceding and following the purchases. Thus, the current study defines the transaction satisfaction based on the comparison between pre-purchase expectations and post-purchase performance of the travel-related products/services, as well as the consumer online purchasing experience of the products/services.

2.2 Tourist Worries

To consume tourism products and services, travelers must leave their home location and move to a geographical different place and engage in activities different from their routines, bringing about some degree of uncertainty and unpredictability, especially at the stage of planning a trip. This leads to tourist worry, defined as "the individual's attempt to engage in mental problem-solving regarding tourist trip-related issues where outcomes are thought to be uncertain and contain possibilities for negative results" (Larsen et al., 2009, 261). Worry is different from risk; while risk measures the potential impact of certain adverse events (as the product of the probability of such events happening and the magnitude of their consequences), worry is a relatively uncontrollable chain of thought as a function of uncertainty concerning possible negative future events (Borkovec, 1994; Freeston et al., 1994). Tourist worries emanate from the uncertainty that tourists face when they cannot foresee the consequences of their purchase decisions (Schiffman &

Kanuk, 2000). Perception of travel risk generates a feeling of anxiety (Reisinger and Mavondo 2005) and fear of unknown consequences (Dowling and Staelin 1994), which leads to tourist worries.

There are many worry-inducing factors, such as health and safety during a trip, financial costs associated with package tours, flights, accommodation, attractions, and activities, ability to complete the trip as planned, and so on. In particular, people tend to worry mostly about whether reservations and tickets may contain mistakes as compared to dangerous hazard, and the level of worry tend to be higher during trip planning than traveling in situ (Larsen et al., 2009). This study focuses on tourist worry also because it has positive effects in helping people finding better ways of doing things and determining priorities relative to the different strategies for reducing uncertainty (Baron et al., 2000).

Because tourism is an experiential good, travelers cannot try out or even perceive the quality of a trip in advance. Such uncertainty at the planning stage naturally leads tourists to worry about purchasing tourism products/services, because decisions can only made based on descriptions available (Werthner & Klein, 1999), and that it is difficult, if not impossible, to evaluate the value for money before the actual experience (Quintal et al., 2010). Worries can arise in the service process of travel bookings, be it through travel agencies, websites, or other intermediaries. For instance, when using an online booking service, travelers need to be presented with necessary information (e.g., user instructions and status updates) to accomplish service tasks (e.g., reservation for local events) and keep track of the service workflow (e.g., checking refund status). If information provided is incomplete or even incorrect, travelers may worry about if the desired services are booked correctly and if they will receive the service accordingly. Worries can also arise from the service-delivery channels themselves, such as the reliability of the service providers or the vulnerability associated with online transactions (e.g., technical problems and security risks). Taken together, tourist worries are likely to have a significant impact on travelers' satisfaction towards travel-related transactions.

We can further examine the role of tourist worries through the lens of the uncertainty reduction theory (Berger, 1986; Berger & Calabrese, 1974), which posits that individuals employ three general categories of information-seeking strategies—passive, active, and interactive—to reduce uncertainty and increase the other party's predictability. Passive strategies involve unobtrusive observations of target individuals to obtain information about them. Active strategies involve seeking information from third parties or through manipulation of the target person's environment. Interactive strategies involve obtaining information directly from the target person through such communication methods as interrogation and self-disclosure. Although the concept of uncertainty reduction originates in interpersonal communication, it is also applicable to consumer service (e.g., Choudhury et al., 1998; Murray, 1991; Siehl et al., 1992), which is often characterized by incomplete and ambiguous information or evidence that consumers must use in evaluating the service (Siehl et al., 1992). In this sense, travelers worried about uncertainty in trip planning and travel transactions would attempt to determine the priorities and strategies of uncertainty reduction leading to an increase in predictability of the behavior of the other party (e.g. travel agents, tour providers, online reservation systems, etc.), which in turn decreases one's worries of the interaction (Baron et al., 2000).

Because purchasing of travel products and services is considered risky (Huang et al., 2010), an active uncertainty strategy such as extensive information search can reduce worry about the risks associated with travel and thus enhance the quality of experience (Money & Crotts, 2003). Based on the conceptualization of tourist worries and the uncertainty reduction theory, we identify smart tourism technological attributes—i.e., informativeness, accessibility, interactivity, and personalization—that contribute to the means of tourist worry reduction. Use of, for instance, review sites such as TripAdvisor and virtual product experience in travel-related websites can help increase predictability of actual experiences from pre-travel arrangements as a major coping means of tourist worries. This need is in sync with the trend that STT play an increasingly important role in all phases of travel planning, such as pre-travel planning and decisions (Gretzel & Yoo, 2008; Yoo et al., 2017) and the final destination choices (Luo & Zhong, 2015).

2.3 Novelty Seeking in Travel

The notion of uncertainty often has negative connotations, but in the case of travel, uncertainty can bring about positive impact. A critical aspect of tourism and travel is that "they supposedly generate pleasurable experience which are different from those typically encountered in everyday life…When we go away, we look at the environment with interest and curiosity" (Urry, 1990, p.1). In other words, travelers look for "novelty," which is generally defined as the degree of contrast between perception at present and experience in the past (Pearson, 1970). The six dimensions of the novelty construct of a tourist (Lee & Crompton, 1992) —change from routine, escape, thrill, adventure, surprise, and boredom alleviation—are all associated, albeit with varying degrees, with the uncertainty nature of travel. Many tourists actively take advantage of such uncertainties and seek novelty in their choices to travel through, for instance, enjoyment in meeting people from other cultures and unexpected types of facilities and attractions of interest; they may purposely engage in "adventure

tourism," in which they step away from their usual, comfortable settings and explore the unique features of the local culture and environment. From a consumer marketing perspective, consumers have a desire for novelty or complexity in making choices (Kahn, 1995). In this study, we adopt the definition of novelty seeking as *the individual's drive to explore contrast between present perception and past experience* (Cohen, 1979; Jang & Feng, 2007; Pearson, 1970).

It is widely acknowledged that novelty seeking is a central component of travel motivation and, therefore, influences tourists' decision-making process (Assaker & Hallak, 2013; Kim & Kim, 2015; Toyama & Yamada, 2012). Prior research has shown that the travel experience meeting or exceeding the expectations for novelty can positively impact a tourist travel satisfaction. Perhaps the most direct support comes from a study by Toyama and Yamada (2012), in which it is found that novelty plays an important role in tourists' perception and contributes to overall satisfaction. At a deeper level, emotional arousal and sensing seeking, both related to novelty of a destination, are found to positive influence a tourist's liminal experience (Zhang & Xu, 2019), and a perceived "coolness" of a destination is positively related to traveler satisfaction (Chen & Chou, 2019). As a result, novelty seeking positively influences a traveler's intention to revisit a destination (Jang & Feng, 2007).

The use of smart tourism technologies is related to novelty seeking in several ways. Conceptually, the inherent novelty seeking desire and behavior are indistinguishable from inherent innovativeness (Hirschman, 1980), paving ways for new and different planning and consumption patterns such as STT. As argued by Jansson (2002), tourism gaze has become increasingly associated with the use of media images, and, as such, STT allow for consumer-governed arrangements more suitable to traveler demands (Kim et al., 2017; Volchek et al., 2020). This may be because individuals often seek to experience a "reality" (thus travel satisfaction) that they already have imagined in their search (use of STT for novel destinations/activities) (Urry, 1990). It is noted that social media and travel reviews play an important role prior to travel by offering ideas and making it easier to visualize the destination (Gretzel & Yoo, 2008) and thus often make travel planning more enjoyable and exciting (Amaro et al., 2016). Further, individuals motivated by novelty are likely to seek out new and potentially discrepant information (Hirschman, 1980). For instance, sensation-seeking travelers are more likely to obtain information via the Internet and purchase travel products online (Park & Stangl, 2020; Pizam et al., 2004), and those who prefer serendipitous travel are more likely to use on-the-fly, real-time information sources such as mobile phones (Huang et al., 2014). As a result, the use of STT can enhance travelers' novelty seeking experience or activities, which can lead to higher level of satisfaction.

3 Research Model and Hypothesis

This current study views novelty seeking and tourist worries, both related to uncertainty, as distinct concepts and sets out to explicitly explore the relationships between these and travel satisfaction. In this context, smart tourism technologies play an ambidextrous role for travelers to develop and discover novel destinations and activities when planning a trip, while helping them mitigate the transaction worries emanated from uncertainty of booking and purchasing decisions made for a trip. Our research model is depicted in Fig. 1.

3.1 Tourist Worries

Tourists worry about trip-related issues with potentially negative outcomes such as crimes in the destinations and whether reservations may contain mistakes (Larsen et al., 2009). At the core of worry is an intolerance of uncertainty about future events, which is a common characteristic of travel products and services since they are intangible in nature and cannot be seen or inspected prior to purchase (Holloway, 2004; Huang et al., 2010; Lui, 2019). When tourists worry about the decisions that they have made for travel-related purchases (for instance, when a traveler reports that "I don't feel comfortable with the reservations that I have just made."), they experience the post-purchase cognitive dissonance as a result of apprehension of possible undesirable outcomes (Cooper & Fazio, 1984; Oliver, 1997; Tseng, 2017). And such post-purchase cognitive dissonance has been shown to increase consumer anxiety and, in turn, may reduce their satisfaction towards purchase decisions (Hofstede, 2001; Jin et al., 2008; Tseng, 2017). Therefore, we argue that,

H1a: Tourist worries is negatively related to transaction satisfaction.

Many risk factors, such as hazards related to political instability of the destination, strange food, culture barriers, and crime, can induce tourist worries (Lepp & Gibson, 2003). In addition to prompting travelers to take on uncertainty reduction strategies, worry, as a cognitive state of mind, causes anxiety toward travel that leads to preoccupation with precautionary behavior and may limit the traveler's satisfaction of the activities at the destination (Abubakar & Mavondo, 2014). For instance, in a study of Chinese tourists to Australia, it is found that the more tourists worry, the more they need to cope emotionally (Wu et al., 2020). We thus posit that tourist worries contribute to limiting the enjoyment of the travel experience and overall satisfaction.
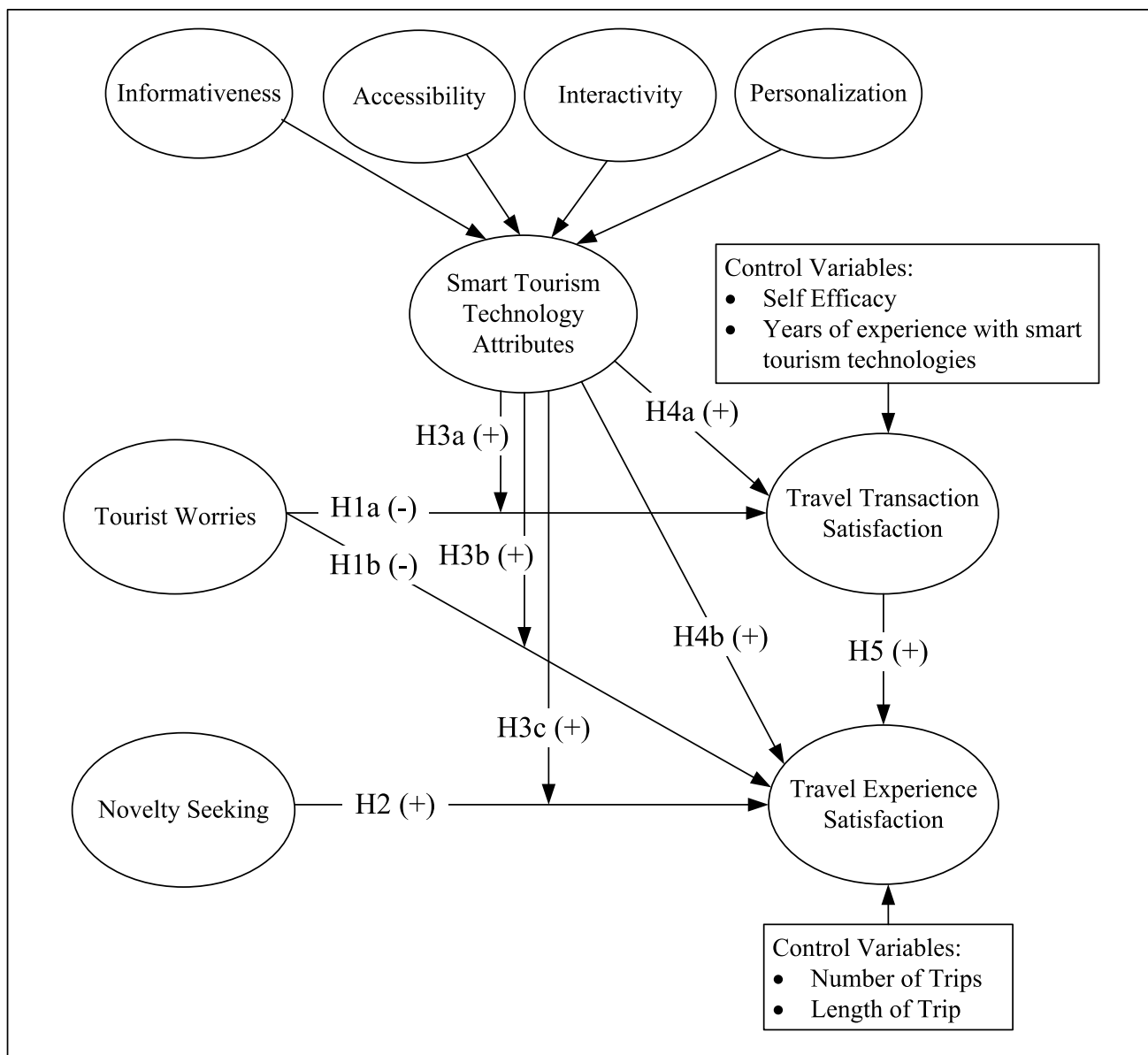
Fig. 1 Research model

H1b: Tourist worries is negatively related to travel experience satisfaction.

3.2 Novelty Seeking

Seeking variety, complexity, and novelty is a common consumer behavior that lead to consumption stimulation, and the resulting emotional arousal is a key determinant for achieving recreation satisfaction (Floyd, 1997). Despite the intrinsic uncertainty of travel due to the departure from familiarity of home location and/or daily activities, travelers seek novelty in a trip to alleviate boredom, change from routines, and escape from reality (Lee & Crompton, 1992).

This is a particularly important aspect in certain styles of travels. For instance, the positive arousal felt by amusement theme park visitors leads to pleasure and satisfaction (Bigné et al., 2005), and the perceived "coolness" positively impacts Generation Y's place attachment and satisfaction towards particular destinations (Chen & Chou, 2019). Although the explorer- and drifter-type travelers may be the most willing to forego the comfort of familiarity and seek out novel experience (Basala & Klenosky, 2001), novelty seeking in general has been found to be a direct, positive antecedent of the mid-term intention to revisit a destination (Jang & Feng, 2007) and has a positive effect on overall satisfaction (Toyama & Yamada, 2012). Therefore, we posit that,

H2: Novelty seeking is positively related to travel experience satisfaction.

3.3 Smart Tourism Technologies' Ambidexterity

Smart tourism technologies play an ambidextrous role for tourists to mitigate the worries emanated from uncertainty of decisions and purchases made during the pre-trip planning, while enhancing their novelty seeking experience. One of important attributes of STT is informativeness. The use of STT for the evaluation and purchase of travel products and services—a significant improvement over the traditional processes of searching and booking with travel agents—counters tourist worries as it acts as the most important information source as well as the most convenient channel for booking transactions. Because tourism goods and services are difficult to physically inspect prior to the purchase, travelers look for other indicators to help them evaluate their values (Korgaonkar and Karson, 2007) and search for and read online comments to seek support for their decision (Fan and Zhang, 2015). In addition, with their accessibility, interactivity, and personalization, STT provide personalized recommendations, evaluations, and reviews from others who have already consumed the same or similar products or services to help travelers find those that meet their specific needs (Zhou and Yang, 2019; Chen and Xie, 2008). STT can also alleviate worries about reliability and performance, as consumers respond strongly to the perceived trust when making online purchase decisions (Kim et al., 2012). As a result, travel-related goods and services have been a leading application of e-commerce (Werthner & Ricci, 2004), and STT have become an essential tool for all phases of travel bookings, from selecting destinations, searching for vendors, comparing prices, to completing transactions (Xiang et al., 2014; Yoo et al., 2017). As evidenced in past studies, using STT in travel planning may thus help tame tourist worries about travel booking and reservations by mitigating the uncertainty and anxiety of tourists (Pana et al., 2021); as such, the negative impact of worries on transaction satisfaction will be weaker as the degree of STT use increases. Therefore, we argue that,

H3a: STT positively moderates the relationship between tourist worries and transaction satisfaction.

STT allow travelers to find the places to visit and prepare for the experience via personal commentaries, content sharing, and other forms of communications (Chung et al., 2017; Narangajavana Kaosiri et al., 2019; Narangajavana et al., 2017). STT such as social media enable travelers to obtain relevant, personalized information about a trip and even consult with those who have already experienced that destination (Huang et al., 2017). For example, using smart tourism apps and services in the destinations can save tourists from worrying about safety (Pai et al., 2021). Because tourists can obtain useful information to counter their worries in the destination and make informed decisions in pre-trip planning, it is likely that they are more satisfied with the whole trip experience. Such acts can significantly reduce a traveler's doubts and worries about a trip so that the negative impact of tourist worries on travel experience satisfaction will be weaker as the degree of STT use increases. We therefore posit that STT plays a moderating role in the relationship between tourist worries and travel experience satisfaction.

H3b: STT positively moderates the relationship between tourist worries and travel experience satisfaction.

Beyond using STT for travel transactions, tourists' level of satisfaction when it comes novelty seeking can be amplified because STT can enhance their experience in both pre-trip searches of and actual encounters with novel locations and activities. For example, travelers increasingly use the Internet to search for destination activities such as hidden attractions and shopping detours to enhance the trip experience (Xiang et al., 2015). Social media allow for a richer, deeper, and more interactive research on various aspects of a trip, create expectations for a destination, and make travelers more excited about a trip (Gretzel et al., 2015; Narangajavana et al., 2017). Smartphones increase the value of the trip, let users "imagine" and plan for new and novel activities, and greatly enable serendipitous travel (Narangajavana Kaosiri et al., 2019; Narangajavana et al., 2017). And online shared photos and videos mediate tourist experience by stimulating fantasies and providing pleasurable memories (Bradley et al., 1992; Narangajavana Kaosiri et al., 2019; Tussyadiah & Fesenmaier, 2009). The use of STT in pursuit of novelty also leads to tourist happiness resulting in travel satisfaction (Shin et al., 2021) and thus destination revisit intention (Pai et al., 2020). All such uses of STT can lead to an exotic location, an on-the-go schedule, or an off-the-beaten-path activity, all of which can enhance the overall travel experience in a novel way so that the positive impact of novelty seeking on travel experience satisfaction will be strengthened as the degree of STT use increases. We therefore hypothesize:

H3c: STT positively moderates the relationship between novelty seeking and travel experience satisfaction.

Aforementioned studies suggest that STT have a positive impact on various phases of travel. It is done through both the exploitation and exploration use of the smart tourism technologies (Huang et al., 2017). The key attributes of STT—informativeness, accessibility, interactivity, and personalization—allow travelers to efficiently and effectively

search tourism products and services and complete transactions, as well as plan for and manage trip itinerary. We therefore posit the explicit relationships between STT and the travel satisfactions:

> H4a: STT is positively related to transaction satisfaction.
> H4b: STT is positively related to travel experience satisfaction.

3.4 Transaction and Travel Experience Satisfaction

Among the most important task in the trip planning stage is to search for and complete reservations and bookings for travel products and services. As the service literature indicates, service quality is critical to the satisfaction of the service, which in turn leads to the satisfaction of the overall experience when the service is performed (Baker & Crompton, 2000; Neal et al., 1999; Otto & Ritchie, 1996). In the context of tourism, it is also found that satisfaction with travel/tourism experience is a positive function of satisfaction with pre-trip (and other) services (Neal et al. (1999). Therefore, we argue that a better experience in travel transactions would lead to a better experience of the whole trip:

> H5: Transaction satisfaction is positively related to travel experience satisfaction.

4 Research Methods

4.1 Data Collection

Data was collected through a survey conducted on the members of one of the largest online travel clubs in Korea, which served as our sampling frame that allowed us to gain access to a large group of people who may hold diverse interests, attitudes, beliefs, and values regarding the travel. While

convenient and cost effective, such sampling frame approach may concern with random sampling and nonresponse rate tracking due to the anonymous nature of the Internet. We followed Andrews et al.'s (2003) approach to overcome this issue and used sample and participant selection quality criteria to maintain the random sampling process within artificially defined sampling frame. Specifically, we first of all came up a list of travel clubs as the result of the key word search with "travel club" from one of the most widely used search engines in Korea. We adopted this list as our sampling frame for the study. Then, we applied the criteria of access (i.e., open access for public participation), size (i.e., the highest number of registered members), and activity (i.e., the most active in terms of the highest number of posts within the past 30 days) to further define the sampling population, from which the travel club was selected for this study. We followed this elaborated process to ensure that the selected travel club appropriately reflected the sampling population that fitted well with the current study context of smart tourism.

Next, with the support of the club administrator, an invitation to participation in the survey was posted in the general notice section. After the definition of STT provided in the survey questionnaire, we asked respondents to choose one STT to complete the survey. With two "reminder" posts in one week apart, we received a total of 325 responses, of which 319 responses were valid without missing values and thus used for the further analysis. The demographics of 319 responses are summarized in Table 1. Overall, the demographic characteristics of respondents in the data indicated a good representation of STT user community and deemed appropriate for the further analysis.

4.2 Operationalization of Constructs

All latent constructs in this research were measured using multi-items adapted from prior studies. We used seven-point

Table 1 Demographic characteristics of respondents (N = 319)

Characteristics		Freq.	%	Characteristics		Freq.	%
Days of trip planning	Less than 1 day	43	13.5	Years of STT use	Less than 1 year	89	27.9
	2–3 days	97	30.4		1–2 years	82	24.7
	4–7 days	82	25.7		2–3 years	45	14.1
	8–14 days	44	13.8		More than 3 years	103	32.3
	15–30 days	30	9.4	Education	Middle School or less	8	2.5
	More than 30 days	23	7.2		High School	41	12.9
Number of leisure trip per year	Never	5	1.6		College	164	51.4
	1–2	186	58.3		Graduate School	106	33.2
	3–4	84	26.3	Gender	Male	172	53.9
	5 or more	44	13.8		Female	147	46.1
Average duration of the trip chosen for the survey: 6.6 days							

Likert rating systems, from 1 being strongly disagree to 7 being strongly agree. Appendix A provides the specific items used in the survey.

Consistent with the tourism literature (cf., Lieber & Fesenmaier, 1985; Neal et al., 1999; Swan & Combs, 1976), our model of travel satisfaction discerns between the transaction satisfaction and the experience satisfaction. We used five items to measure travel experience satisfaction and four items to measure travel transaction satisfaction (Neal et al., 1999). To properly respond to the criticism of inefficacy of using the psychometric measure for capturing the degree of satisfaction in travel (c.f., Brown et al., 1993; Cronbach & Furby, 1970; Lord, 1963; Teas, 1993), we followed Baker and Crompton (2000) and Huang et al. (2017) by employing a subjective disconfirmation measure for both transaction and travel experience satisfaction. Specifically, respondents were asked to record a single score from their own evaluation of satisfaction directly against their desired satisfaction level.

Tourists' worries should vary as a function of situational factors and depend on the individuals' expectations and experiences of such factors. Three items were adopted from Larsen et al. (2009) to capture individual's state of being a tourist that pertains to the various uncertainties when travelling, as opposed to a personal disposition or a trait, as measured in generalized worry. We adopted three items from Kim and Kim (2015) to substantively capture various dimensions of novelty seeking (cf., Lee & Crompton, 1992) involving an altered routine as well as new experience and discovery by pleasant surprises.

Consistent with Huang et al. (2017) and Yoo et al. (2017), we measured smart tourism technologies as a second order construct consisting of four first order constructs, namely i) personalization, ii) informativeness, iii) interactivity, and iv) accessibility. They represent four distinct aspects of the smart tourism technologies while grouped under a single multidimensional construct (Law & Wong, 1999). We implemented the second-order factor as formative construct by aggregating in appropriate combinations to form a super-ordinate second-order construct STT because multiple first-order constructs and their measurement items are necessary in order to fully capture the entire domain of the STT construct; we do not anticipate the elements of a particular attribute to be necessarily correlated with each other.

Three items were used to measure the personalization aspect of STT, capturing the perception of travelers (respondents) if STT meet their specific needs or information. Three items were used to measure the informativeness aspect of STT. They captured how much travelers (respondents) perceive information obtained through STT as useful or relevant. We used three items to measure travelers' (respondents') perception about the interactivity aspect of STT, which aided real-time communication and information

sharing among users. Three measures were used to capture how easy travelers (respondents) could access and use STT.

We included two control variables—years of experience in and self-efficacy of smart tourism technologies—in our model to control for possible influence on the travel transaction satisfaction. The number of trips and the length of trip were also included in the model to control their possible influence on the travel experience satisfaction.

5 Results and Analysis

We adopted Partial Least Squares structural equation modeling (PLS-SEM) method with the SmartPLS package (Ringle et al., 2005) for testing both the measurement model and the structural model. We chose the PLS techniques because the current study is more prediction-oriented by exploring the relationships among these uncertainty-driven constructs and the moderation effects in a unique setting of smart tourism than validating the nomological network of the model using the covariance-based SEM (Fornell & Bookstein, 1982). For that, SmartPLS provides the ability to model latent constructs even under conditions of non-normality and small-to medium-size samples (Ringle et al., 2005). Additionally, PLS is appropriate in this study because of its effectiveness of testing the model with a small sample size (Chin, 1998a). The conservative sample size requirements for PLS models is 10 times either (a) the largest number of formative indicators in a block or (b) the largest number of independent variables impacting a dependent variable, whichever is greater (Chin, 1998b). Our sample size of 319 exceeds the recommended minimum of 50 for adequate model testing. In addition, the PLS technique allows for our second order STT construct to be modeled as formative with four first-order constructs in the structural model.

5.1 Measurement Model

A thorough assessment of the measurement model was performed. First, both exploratory and confirmatory factor analyses revealed and confirmed nine factors with high loadings of 0.7 and above, supporting the unidimensionality of the scales (see Table 2). Cronbach's alpha of all constructs employed in this study were higher than 0.74, showing strong reliability of latent constructs (Nunnally, 1978). Next, the convergent validity of the measurement model was tested using composite reliability and average variance extracted (AVE) (Johnson & Wichern, 2007). Table 2 shows that composite reliability values are greater than the lowest of 0.76 and AVE ranged from 0.54 to 0.86, confirming the convergent validity of the measurement model (Fornell & Larcker, 1981).

Table 2 Factor and cross loadings (N = 319)

	Accessibility (ACCESS)	Informativeness (INFO)	Interactivity (INTER)	Novelty Seeking (NS)	Personalization (PERSO)	Travel Experience Satisfaction (TESAT)	Travel Tansaction Satisfacton (TTSAT)	Tourist Worries (TW)	Self-efficacy (SE)	Years of Experience	Length of Trip	Number of Trip	AVE	Composite Reliability	Cronbachs Alpha
ACCES1	0.88	0.43	0.22	0.24	0.39	0.34	0.44	-0.38	0.3	-0.01	0.01	0.04	0.81	0.93	0.88
ACCES2	0.93	0.47	0.27	0.19	0.42	0.42	0.5	-0.44	0.36	0.041	0.06	0.04			
ACCES3	0.89	0.46	0.37	0.28	0.46	0.4	0.42	-0.36	0.35	0.03	0.19	0			
INFO1	0.42	0.87	0.29	0.24	0.39	0.39	0.45	-0.36	0.26	-0.01	0.16	0.08	0.79	0.92	0.87
INFO2	0.45	0.91	0.3	0.26	0.42	0.48	0.55	-0.46	0.35	0.01	0.19	0.06			
INFO3	0.46	0.88	0.3	0.2	0.46	0.47	0.54	-0.48	0.29	-0.03	0.17	0.01			
INTER1	0.18	0.13	0.75	-0.02	0.34	0.18	0.21	-0.16	0.08	0.08	0.13	0.09	0.66	0.85	0.75
INTER2	0.2	0.25	0.82	-0.06	0.5	0.24	0.25	-0.16	0.16	0.01	0.21	-0.01			
INTER3	0.36	0.38	0.86	0.15	0.62	0.26	0.35	-0.25	0.16	0.06	0.2	0.11			
NS1	0.26	0.26	0.03	0.99	0.06	0.19	0.19	-0.13	0.32	-0.05	-0.04	0.04	0.54	0.76	0.74
NS2	0.16	0.12	0.09	0.6	0.12	0.01	0.11	-0.01	0.12	-0.15	-0.08	-0.03			
NS3	0.18	0.16	0.12	0.65	0.1	0.02	0.07	-0.02	0.19	0	-0.08	0.03			
PERSO1	0.47	0.49	0.57	0.09	0.88	0.34	0.4	-0.33	0.19	-0.07	0.14	-0.01	0.76	0.9	0.84
PERSO2	0.37	0.41	0.56	0.07	0.87	0.32	0.32	-0.21	0.15	0.05	0.13	-0.01			
PERSO3	0.39	0.34	0.48	0.02	0.85	0.27	0.34	-0.25	0.23	-0.05	-0.03	0.01			
TESAT1	0.37	0.4	0.18	0.14	0.26	0.79	0.42	-0.49	0.21	0.07	0.04	0.01	0.65	0.9	0.86
TESAT2	0.29	0.37	0.25	0.11	0.22	0.72	0.4	-0.43	0.16	0.01	0.11	0.01			
TESAT3	0.3	0.37	0.24	0.13	0.35	0.84	0.44	-0.43	0.25	0.04	0.1	0.03			
TESAT4	0.43	0.46	0.25	0.17	0.28	0.85	0.43	-0.42	0.21	0	0.13	0.11			
TESAT5	0.35	0.42	0.22	0.14	0.34	0.81	0.31	-0.44	0.27	-0.02	0.14	0.07			
TTSAT1	0.45	0.5	0.37	0.14	0.35	0.47	0.83	-0.73	0.27	0.03	0.21	0.1	0.65	0.88	0.82
TTSAT2	0.39	0.46	0.29	0.2	0.38	0.46	0.83	-0.69	0.26	0.03	0.15	0.1			
TTSAT3	0.43	0.48	0.2	0.12	0.33	0.4	0.8	-0.68	0.17	-0.01	0.09	0.06			
TTSAT4	0.35	0.43	0.23	0.16	0.25	0.43	0.77	-0.55	0.23	0.04	0.16	0.15			
TW1	-0.37	-0.4	-0.24	-0.09	-0.27	-0.48	-0.32	0.9	-0.2	-0.1	-0.15	-0.13	0.82	0.93	0.89
TW2	-0.44	-0.48	-0.24	-0.16	-0.33	-0.51	-0.35	0.9	-0.24	-0.1	-0.14	-0.08			
TW3	-0.37	-0.45	-0.19	-0.08	-0.22	-0.5	-0.26	0.9	-0.18	-0.04	-0.11	-0.14			
SE1	0.36	0.32	0.18	0.31	0.21	0.23	0.25	-0.2	0.93	0.09	0.1	0.03	0.86	0.95	0.92
SE2	0.34	0.31	0.16	0.32	0.2	0.26	0.26	-0.19	0.95	0.1	0.04	0.03			
SE3	0.35	0.32	0.14	0.25	0.19	0.26	0.29	-0.25	0.91	0.15	0.13	0.06			
Years of Experience	0.02	-0.01	0.06	-0.06	-0.02	0.03	0.03	-0.09	0.13	1	0.04	0.32	1	1	1

Table 2 (continued)

	Accessibility (ACCESS)	Informativeness (INFO)	Interactivity (INTER)	Novelty Seeking (NS)	Personalization (PERSO)	Travel Experience Satisfaction (TESAT)	Travel Transaction Satisfacton (TTSAT)	Tourist Worries (TW)	Self-efficacy (SE)	Years of Experience	Length of Trip	Number of Trip	AVE	Composite Reliability	Cronbachs Alpha
Length of Trip	0.1	0.2	0.22	-0.05	0.09	0.13	0.19	-0.14	0.1	0.04	1	-0.01	1	1	1
Number of Trip	0.03	0.06	0.08	0.04	-0.01	0.05	0.13	-0.13	0.04	0.32	-0.01	1	1	1	1

The results provided in Tables 2 and 3 confirm the discriminant validity of the measurement model: 1) correlation between pairs of constructs is below the recommended threshold (Hair et al., 2009), 2) cross-loadings of all items have a higher value in the corresponding construct than in any other constructs, and 3) the square root of AVE for each construct is greater than its correlation level.

5.2 Common Method Bias

We followed the suggestion by Podsakoff et al. (2003) to adequately address the possible common method bias. First, two different response formats were employed for independent variables and dependent variables to control the possible methodological artifact in the response process (Podsakoff et al., 2003). For example, we use seven-point Likert scale to measure predictor and moderator variables, whereas the subjective disconfirmation measure is used for both dependent variables of travel transaction and travel experience satisfaction. Second, Harman's one-factor test (Podsakoff et al., 2003) and Lindell and Whitney's (2001) marker variable test were conducted to gauge the threat of common methods bias. The results of the Harman's one-factor test showed no dominating single factor with the first factor accounted for only 22.15% of the total 78.44% variance. In addition, using a three-item latent construct, *need for cognition* ($\alpha = 0.78$), for which there exists little theoretical basis for a relationship with our research variables, we performed the Lindell and Whitney (2001) marker variable test. The results showed that the maker variable's average correlation with the research variables in the model was low ($r = 0.08$) and insignificant. Taken together, we conclude that common method bias is not a serious threat in this study (Podsakoff et al., 2003).

5.3 Structural Model

The assessment and estimation of the structural model was conducted using SmartPLS (Ringle et al., 2005). A bootstrapping procedure with resampling of 500 subsamples was conducted to determine the statistical significance of the parameter estimates. Based on the results of this procedure, the precision of the magnitude, statistical significance of the path coefficients, and R^2 in the structural model were assessed. Overall, the results suggest a satisfactory fit of the model to the data with the R^2 values of the two dependent variables: 0.49 and 0.74 for travel transaction satisfaction and travel experience satisfaction, respectively. The results of the PLS analysis are provided in Fig. 2.

We first note that the results of tourist worries were mixed. It was significantly and negatively associated with travel transaction satisfaction ($\beta = -0.335$, $p < 0.01$), supporting H1a. However, the relationship with travel experience satisfaction, albeit a negative association, showed

Table 3 Construct correlations

	Mean	SD	ACCESS	INFO	INTER	PERSO	NS	TW	TESAT	TTSAT	SE	Years of Experience	Length of Trip	Number of Trip
Accessibility (ACCESS)	5.02	1.30	**0.9**											
Informativeness (INFO)	4.87	1.13	0.52	**0.89**										
Interactivity (INTER)	4.57	1.37	0.32	0.33	**0.81**									
Personalization (PERSO)	4.41	1.26	0.47	0.47	0.62	**0.87**								
Novelty Seeking (NS)	5.10	1.39	0.26	0.26	0.04	0.07	**0.73**							
Tourist Worries (TW)	4.86	1.30	-0.44	-0.49	-0.25	-0.3	-0.12	**0.9**						
Travel Experience Satisfacton (TESAT)	5.09	1.13	0.43	0.5	0.28	0.36	0.17	-0.55	**0.8**					
Travel Tansaction Satisfacton (TTSAT)	4.84	1.09	0.5	0.58	0.34	0.41	0.19	-0.52	0.57	**0.81**				
Self-efficacy (SE)	5.31	1.42	0.37	0.34	0.17	0.22	0.32	-0.23	0.27	0.29	**0.93**			
Years of Experience	2.51	1.21	0.02	-0.01	0.06	-0.02	-0.06	-0.09	0.03	0.03	0.13	1		
Length of Trip	6.60	1.15	0.1	0.201	0.22	0.09	-0.05	-0.14	0.13	0.19	0.1	0.04	1	
Number of Trip	1.52	0.75	0.03	0.061	0.08	-0.01	0.04	-0.13	0.05	0.13	0.04	0.32	-0.01	1

Bolded diagonal elements are the square root of average variance extracted (AVE)

statistically insignificant. Thus, H1b was not supported. The interpretation of these interesting results is discussed in the next section. Novelty seeking was significantly and positively related to travel experience satisfaction ($\beta = 0.261$, $p < 0.05$), supporting H2. Consistent with the literature, the relationship between travel transaction satisfaction and travel experience satisfaction was strongly significant and positive ($\beta = 0.585$, $p < 0.001$), supporting H5. Overall, the results confirm our view that the tourists' novelty seeking would enhance the trip experience, leading to the tourists' overall travel satisfaction. In contrast, tourist worries would negatively affect tourists' travel transaction satisfaction.

Second, the STT's ambidexterity in moderating the relationships between two intrinsic, uncertainty-driven attributes of travel—tourist worries and novelty seeking—and the travel transaction satisfaction as well as travel experience satisfaction panned out well as hypothesized. Our interaction terms are modeled with the STT acting as "quasi" moderators (Carte & Russell, 2003; Sharma & James, 1981), because the STT is also hypothesized to directly impact both travel transaction satisfaction and travel experience satisfaction. In other words, our interaction terms take the form $y = x + z + x{*}z$, where y is travel transaction satisfaction or travel experience satisfaction, x is two intrinsic, uncertainty driven variables (tourist worries and novelty seeking), and z is STT. The moderation effect of STT on the negative relationship between tourist worries and travel transaction satisfaction was significant and positive ($\beta = 0.352$, $p < 0.001$), in addition to its significant and positive direct effect on travel transaction satisfaction ($\beta = 0.393$, $p < 0.001$), supporting H3a and H4a. This indicates that STT positively affect the

tourist's travel transaction satisfaction by mitigating worries emanated from the uncertainty of transaction (during pre-trip planning or in situ). However, the role of STT on travel experience satisfaction was mixed. The moderation effect of STT on the insignificant negative relationship between tourist worries and travel experience satisfaction also turned out to be insignificant, not supporting H3b. However, the moderation effect of STT on the positive relationship between novelty seeking and travel experience satisfaction was significant and positive ($\beta = 0.395$, $p < 0.05$), in addition to its significant and positive direct effect on travel experience satisfaction ($\beta = 0.378$, $p < 0.05$), supporting H3c and H4b. This indicates that STT positively affect tourists' travel experience satisfaction by allowing and enabling them to seek and explore variety and excitement on their trips. Lastly, all the control variables turned out to be insignificant.

6 Discussion

The current study conceptualized the tourist uncertainty with two constructs, tourist worries and novelty seeking, since reducing worries and promoting novel expectations about travel destinations or overall travel experience have been core parts of planning and preparing the travels (Cohen, 1972; Fennell, 2017; Huang et al., 2010). We explicitly explored their relationship with travel satisfaction and examined how the attributes and the ambidextrous role of smart tourism technologies play in forming tourists' transaction and travel experience satisfaction. The research model is extensively supported with the empirical analysis, and
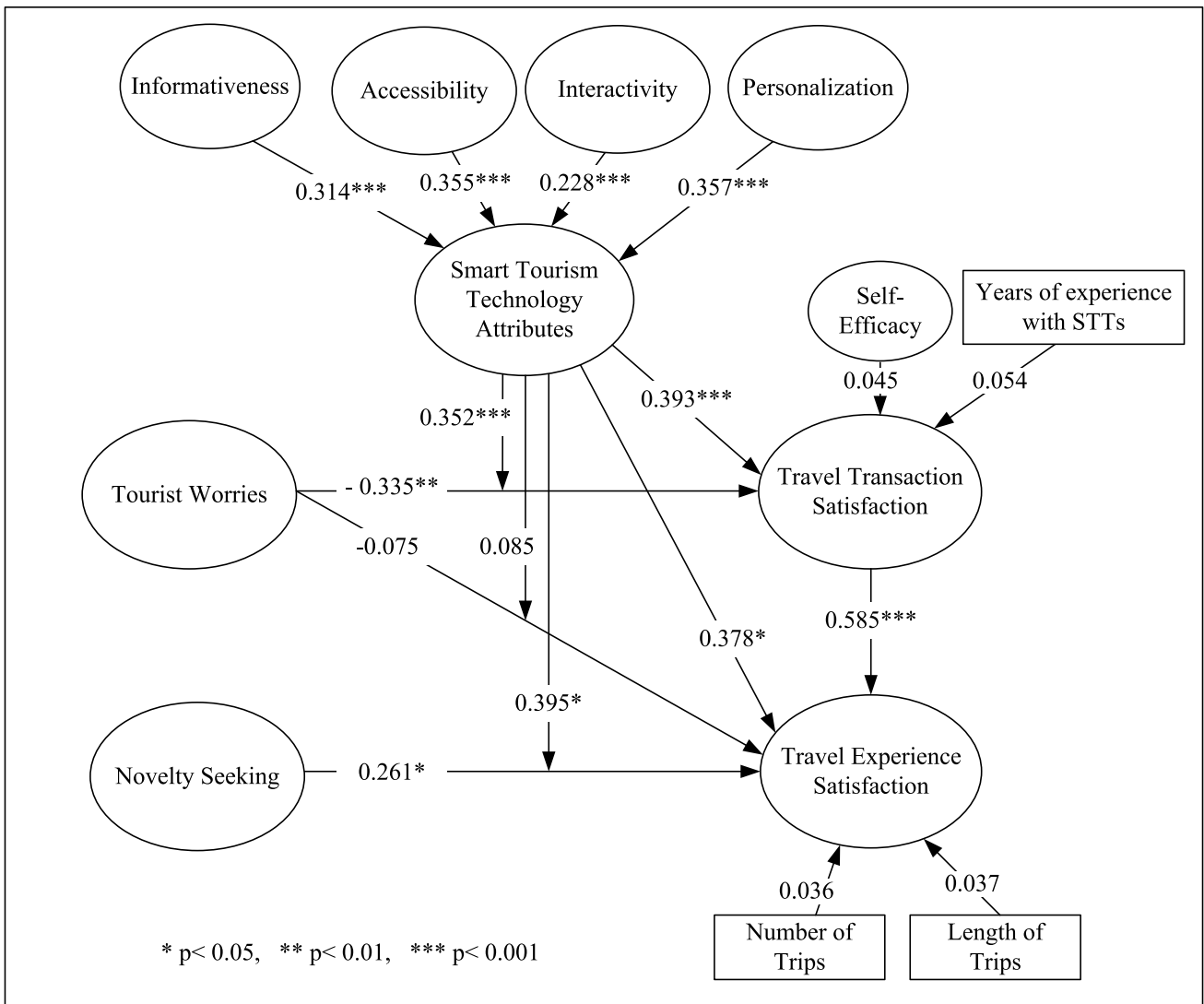
Fig. 2 Results

our findings yield a rich set of critical insights and important contributions to theory development in the use of smart technologies in tourism.

First, we reframed the travel uncertainty with two different and opposing aspects of the tourists. More often than not, uncertainty is associated with negative expectations, such as an important antecedent of risk (Fennell, 2017; Williams & Baláž, 2015). However, we noticed that in the domain of tourism, uncertainty due to departure from routine and familiarity also plays a positive role in promoting travel satisfaction by encouraging and enabling the various tourist gazes with curiosity and new discovery through ways of encountering or experiencing the novelty in the tour destinations (Chen & Chiou-Wei, 2009; Chen & Chou, 2019; Pizam et al., 2004; Urry, 1990; Williams & Baláž, 2015). Advancing this view, this study theorized

two constructs (i.e., tourist worries and novelty seeking) in the uncertainty framework and empirically demonstrated that they both significantly and simultaneously influence transaction satisfaction and travel experience satisfaction. Specifically, tourist worries negatively influence transaction satisfaction (cf., Borkovec, 1994; Jin et al., 2016; Larsen et al., 2009), whereas tourists' novelty seeking positively impacts travel experience satisfaction (cf., Assaker & Hallak, 2013; Jang & Feng, 2007; Kim & Kim, 2015; Toyama & Yamada, 2012). This unique theoretical frame that identified and confirmed two intrinsic, uncertainty-induced factors co-existing and impacting travel satisfaction in opposite ways not only extends the extant tourism literature on uncertainty associated with travel but also offers additional research opportunities to the future studies in this domain.

Second, this theoretical frame about travel uncertainty also prompted us to explore tourist behaviors to counter worries—the negative side of tourist uncertainty—while seeking novelty—the positive side of tourist uncertainty—in order to increase travel satisfaction. We examined this possibility extensively with the role of smart tourism technologies, as the spread of STT has critically changed the landscape of tourism by providing accessible and personalized information in interactive platforms (Gretzel et al., 2015; Xiang & Gretzel, 2010; Xiang et al., 2015). Our study examined the direct relationship between STT and travel transaction and experience satisfaction, and our findings were consistent with the extant literature (e.g., Huang et al., 2017; Koo et al., 2015; Neuhofer et al., 2015; Wang et al., 2012; Yoo et al., 2017). More important, this study provided a nuanced picture of how STT interact with the tourist's efforts in managing worries and seeking novelty to enhance travel satisfaction. Our findings show that STT attributes significantly moderate the relationships between tourist worries and transaction satisfaction and between novelty seeking and travel experience satisfaction. Figure 3 shows the interaction plots as to how the travel satisfaction, given tourist worries and novelty seeking, changes at different levels of correspondents' STT use.

Our post hoc analysis clearly shows that the respondent groups of high- and low-level use of STT have different slopes in two interaction plots. Specifically, the degree of travel transaction satisfaction (TTSAT) drops drastically in the respondent group with low STT use as tourist worries creep in. However, even with growing tourist worries, the travel transaction satisfaction of the group with the high STT use shows a flattening pattern (albeit still decreasing slightly). This indicates the mitigating impact of STT on tourist worries, especially for those tourists with high level

of worries. The plot of novelty seeking shows that the travel experience satisfaction goes upward as tourist's novelty seeking increases. In particular, the travel experience satisfaction of the group with high level of STT use increases more quickly than that of the group with low use of STT. This result indicates that even though novelty seeking in general increases overall travel experience for all, the group with high-level use of STT seems to be able to enhance their trip experience through excitement and variety more than those with low-level of STT use. This finding not only asserts the importance of using STT in travel planning, consistent with literature (Steinbauer & Werthner, 2007), but also provides insight into the mechanism of how such impact takes place.

It is interesting to further examine STT's ambidexterity that mitigates the negative side (i.e., tourist worries) while enhancing the positive impact (i.e., novelty seeking) of travel uncertainty with respect to existing literature. Given that most of recent studies explore the theoretical aspects or the simple relationship between STT and satisfaction (Ahani et al., 2019; Kirova & Thanh, 2019), this study tests the moderating role of STT empirically to uncover how STT interact with other existing variables to produce satisfaction as outcomes. Interestingly, travelers often cope with considerable uncertainty in pre-trip decisions, caused not by the lack of information but by cognitive overload from too much information, as it is difficult, if not impossible, to navigate and examine numerous alternative products and services as well as a variety of promotional deals (Xu & Schrier, 2019). Well-designed STT with pictorial metaphor and virtual product experience in travel-related websites such as TripAdvisor and Airbnb, for example, can help reduce the traveler's cognitive effort and induce a simple and effective decision (Hopf et al., 2020; Mirsarraf et al., 2018; Steinmann et al.,
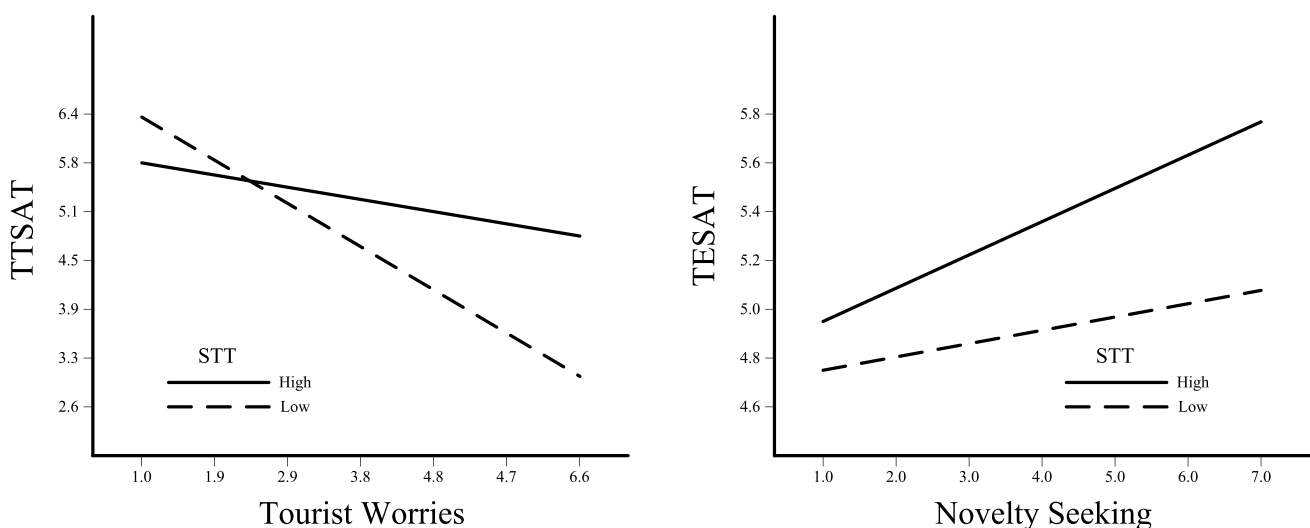

Fig. 3 Interaction plots

2014), as well as minimizing undesirable outcomes or post-purchase regret (Riquelme & Kegeng, 2004; Román, 2010). Our study also confirms the findings in the information systems (IS) literature, suggesting that IS plays an important role in addressing uncertainty issues. For example, IS has been found to critically reduced the uncertainty in e-commerce, an important factor that hinders transactions (Pavlou et al., 2007). At the same time, IS also provides playfulness and hedonic values to users (Lowry et al., 2013). STT, as an advanced form of IS, can be a game changer in dealing with both positive and negative aspects of travel uncertainty simultaneously (cf., Werthner et al., 2015).

7 Conclusion and Future Research Direction

With the clear evidence that travelers' use of smart tourism technologies enriches their travel experience and satisfaction by reducing worries and facilitating novelty seeking, especially in the travel planning stage, our study not only advances theory development in smart tourism but also offers important implications to the tourism providers and promoters. Except for the more complicated products and services (such as cruises or tours), travel transactions have largely moved online. In addition to being more convenient and efficient than the traditional face-to-face meetings or phone calls with travel agents, use of STT in completing transactions also alleviates tourist worries, leading to higher level of transaction satisfaction. Based on the findings of this study, travel vendors can expect more positive reactions from travelers by taking on measures to further ease their worries about bookings and reservations. As an example of such worry-reduction applications, United Airlines specifically prints "Book without worry; Cancel for free within 24 hours of booking" right below the "Confirm" or "Continue" button on the reservation page to encourage immediate booking.

The findings of this study also imply that travel bureaus and tour promoters can take measures to call upon travelers' intention to seek novelty in trips through STT by increasing the exploration and uniqueness aspect of a tour or destination on the promotional websites, social media pages, and apps (Assaker & Hallak, 2013; Jang & Feng, 2007; Toyama & Yamada, 2012). As Urry (1990) suggested, the tourist gaze is structured by culturally specific notions of what is extraordinary and therefore worth viewing. On the travel destination page, for instance, in addition to the usual topics such as "where to eat," "where to stay," and "what to do," focused coverage of a few unusual activities and unique spots with photos and videos shared by previous travelers can stimulate daydreaming and anticipation for travelers seeking escape from familiarity and routines with personalized itineraries (Neuhofer et al., 2015; Volchek et al., 2019). Such practices offer opportunities for novelty-minder travelers to explore

destinations, gaze at particular objects, in the company of various types of people.

COVID-19 has significantly increased the travel risk perception to the extent that negatively impacts the intention to travel (Sánchez-Cañizares et al., 2021), and the STT's ambidexterity may have even greater implications in the post-pandemic era. On the one hand, the use of STT can help alleviate such uncertainties: It is found, for instance, that COVID-9 has caused tourists to increase their intention to use smartphones, especially to when making payments for purchases (García-Milon et al., 2021). On the other hand, STT allow travelers to engage in novel-seeking activities via "virtual travel" before or even in lieu of actual physical trips (Atsiz, 2021; Zhang et al., 2022). Applying and extending the findings of the current study on STT's role in travelers' perceptions, behaviors, and satisfactions amid uncertainty can significantly contribute to tourism research and practice after COVID-19.

Although this study was conducted based on sound theories and valid methodologies, it is not without limitations. First, we collected data from tourists in South Korea. Therefore, we can assume that the results of the study reflect the sample group. Tourists with different nationality or ethnicity may have different travel motivations, gazes, and travel planning (Kozak, 2002), thus leading to different types of satisfaction (Lee et al., 2004). Therefore, to generalize the findings of the study, future studies can be done with data from other countries and various backgrounds. Second, we designed a second-order construct, STT attributes, with four formative first-order constructs, informativeness, accessibility, interactivity, and personalization in the study. Although this design shows significant results, other facets of STT can be also considered. In addition, we used STT as an umbrella term. It is possible that if the STT is defined in a narrow scope (such as mobile apps or payment systems only), different aspects of STT can be studied individually. Future studies can take that approach to extend the understanding STT attributes. Third, the current research explores the STT's ambidexterity by taking a snapshot of the informants who already completed the trips. However, STT may work differently in different phases of travel. For example, travel satisfaction may change weeks or even months after the completion of a trip through sharing pictures and dialogues with friends and family. As such, different attributes of STT may impact travel satisfaction at different phases of travel. Therefore, we believe that dividing travel phases further with multiple data collections will provide more complete picture of STT and travel experience in future research. Lastly, this study examines the role of STT from a single traveler's perspective. When there is more than one person planning the trip, such as in the case of a couple or a travel group, the balance between tourist worries and novelty seeking could be determined by the difference in personalities, and the

moderating role of STT can therefore be different. Examining the STT's ambidexterity in the existence of multiple decision makers in travel planning is an interesting and useful extension of the current study.

Survey Items

Construct		Items
Interactivity*	1.	A lot of other users' questions and answers can be found on tourism websites and apps.
	2.	The tourism websites and apps that I use are highly responsive to users.
	3.	It is easy to share content (e.g. tourism information) on tourism websites and apps.
Informativeness*	1.	1. Tourism websites and apps provide useful information of the destination(s) and the trip.
	2.	2. I expect tourism websites and apps to help me evaluate the destination(s) and the trip.
	3.	3. The tourism websites and apps enable me to complete my travel with detailed information provided.
Accessibility*	1.	I can use tourism websites and apps anytime and anywhere.
	2.	I find tourism websites and apps easy to use.
	3.	Tourism websites and apps can be easily found.

Construct		Items
Personalization*	1.	Tourism websites and apps allow me to receive tailored information.
	2.	I can interact with tourism websites and apps to get personalized information.
	3.	The personalized information provided by tourism websites and apps meets my needs.
Tourist Worries*	1.	I worry about planning a trip as it involves a high degree of uncertainty.
	2.	When on a trip, I think about things that may go wrong.
	3.	I worry that the reservations and bookings that I made for the trip may not be what I wanted or expected.
Novelty Seeking*	1.	I want to experience new and different things on my vacation.
	2.	I feel a powerful urge to explore the unknown on vacation.
	3.	I look forward to experiencing the unexpected on my vacation.
Travel Transaction Satisfaction	My Satisfaction with transaction was (1 being "lower than my desired satisfaction level", 4 being "the same as my desired satisfaction level", and 7 being "Higher than my desired satisfaction level")	
	When it comes to………	
	1.	Service quality
	2.	Comfort
	3.	Safety
	4.	Logistics and Itinerary

Construct	Items	
Travel Experience Satisfaction	My satisfaction with Travel Experiences was (1 being "lower than my desired satisfaction level", 4 being "the same as my desired satisfaction level", and 7 being "Higher than my desired satisfaction level")	
	When it comes to………	
	1.	Enjoyment
	2.	Value for the money
	3.	Excitement
	4.	Memorability
	5.	Impression
Self-Efficacy*	1.	I have necessary skills to use tourism apps or websites.
	2.	I have knowledge of using tourism apps or websites.
	3.	I am confident of using tourism apps or websites even if there is no one around to show me how to do it.
Years of Experience with Smart Tourism Technologies	Number of years of using smart tourism technologies	
Length of Trip	Length of the trip you chose (in days)	
Number of Trip	Number of leisure travel experience per year	

Note: * Seven-point Likert scale (1 being strongly disagree and 7 being strongly agree)

Declarations

Conflict of Interest The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Abubakar, B., & Mavondo, F. (2014). Tourism destinations: Antecedents to customer satisfaction and positive word-of-mouth. *Journal of Hospitality Marketing and Management, 23*(8), 833–864.

Ahani, A., Nilashi, M., Yadegaridehkordi, E., Sanzogni, L., Tarik, A. R., Knox, K., Samad, S., & Ibrahim, O. (2019). Revealing customers' satisfaction and preferences through online review analysis: The case of Canary Islands hotels. *Journal of Retailing and Consumer Services, 51*, 331–343.

Amaro, S., Duarte, P., & Henriques, C. (2016). Travelers' use of social media: A clustering approach. *Annals of Tourism Research*, (59), 1–15.

Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic survey methodology: A case study in reaching hard-to-involve internet users. *International Journal of Human-Computer Interaction, 16*(2), 185–210.

Assaker, G., & Hallak, R. (2013). Moderating effects of tourists' novelty-seeking tendencies on destination image, visitor satisfaction, and short-and long-term revisit intentions. *Journal of Travel Research, 52*(5), 600–613.

Atsiz, O. (2021). Virtual reality technology and physical distancing: A review on limiting human interaction in tourism. *Journal of Multidisciplinary Academic Tourism, 6*(1), 27–35.

Azis, N., Amin, M., Chan, S., & Aprilia, C. (2020). How smart tourism technologies affect tourist destination loyalty. *Journal of Hospitality and Tourism Technology, 11*(4), 603–625.

Baker, D. A., & Crompton, J. L. (2000). Quality, satisfaction and behavioral intentions. *Annals of Tourism Research, 27*(3), 785–804.

Baron, J., Hershey, J. C., & Kunreuther, H. (2000). Determinants of priority for risk reduction: The role of worry. *Risk Analysis, 20*(4), 413–428.

Basala, S. L., & Klenosky, D. B. (2001). Travel-style preferences for visiting a novel destination: A conjoint investigation across the novelty-familiarity continuum. *Journal of Travel Research, 40*(2), 172–182.

Berger, C. R. (1986). Uncertain outcome values in predicted relationships: Uncertainty reduction theory then and now. *Human Communication Research, 13*(1), 34–38.

Berger, C. R., & Calabrese, R. J. (1974). Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research, 1*(2), 99–112.

Bigné, J. E., Andreu, L., & Gnoth, J. (2005). The Theme Park experience: An analysis of pleasure, arousal and satisfaction. *Tourism Management, 26*(6), 833–844.

Borkovec, T. D. (1994). The nature, functions, and origins of worry. In G. Davey & F. Tallis (Eds.), *Worrying. Perspectives on theory, assessment and treatment* (pp. 5–33). John Wiley & Sons.

Bradley, M. M., Greenwald, M. K., Petry, M. C., & Lang, P. J. (1992). Remembering pictures: Pleasure and arousal in memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 18*(2), 379.

Brown, T. J., Churchill, G. A., & Peter, J. P. (1993). Improving the measurement of service quality. *Journal of Retailing, 69*(1), 127–139.

Buhalis, D. (2003). *E-tourism: Information technology for strategic tourism management*. Pearson.

Carte, T. A., & Russell, C. J. (2003). In pursuit of moderation: Nine common errors and their solutions. *MIS Quarterly, 27*(3), 479–501.

Chen, C.-F., & Chiou-Wei, S. Z. (2009). Tourism expansion, tourism uncertainty and economic growth: New evidence from Taiwan and Korea. *Tourism Management, 30*(6), 812–818.

Chen, C.-F., & Chou, S.-H. (2019). Antecedents and consequences of perceived coolness for generation Y in the context of creative tourism - a case study of the pier 2 art Center in Taiwan. *Tourism Management*, (72), 121–129.

Chin, W. W. (1998a). Issues and opinion on structural equation modeling. *MIS Quarterly, 22*(1), vii–xvi.

Chin, W. W. (1998b). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Lawrence Erlbaum Associates.

Choudhury, V., Hartzel, K. S., & Konsynski, B. R. (1998). Uses and consequences of electronic markets: An empirical investigation in the aircraft parts industry. *MIS Quarterly, 22*(4), 471–507.

Chung, N., & Koo, C. (2015). The use of social media in travel information search. *Telematics and Informatics, 32*(2), 215–229.

Chung, N., Tyan, I., & Han, H. (2017). Enhancing the smart tourism experience through geotag. *Information Systems Frontiers, 19*(4), 731–742.

Cohen, E. (1972). Toward a sociology of international tourism. *Social Research, 39*(1), 164–182.

Cohen, E. (1979). Rethinking the sociology of tourism. *Annals of Tourism Research, 6*(1), 18–35.

Constantin, A. M. (2012). The antecedents of E-satisfaction and E-loyalty. *Timisoara Journal of Economics, 5*(18), 236–252.

Cooper, J., & Fazio, R. H. (1984). A new look at dissonance. *Advances in Experimental Social Psychology, 17*, 229–268.

Cronbach, L. J., & Furby, L. (1970). How we should measure" change": Or should we? *Psychological Bulletin, 74*(1), 68.

del Bosque, I. R., & San Martín, H. (2008). Tourist satisfaction a cognitive-affective model. *Annals of Tourism Research, 35*(2), 551–573.

Fennell, D. A. (2017). Towards a model of travel fear. *Annals of Tourism Research*, (66), 140–150.

Filieri, R., Alguezaui, S., & McLeay, F. (2015). Why do travelers trust Tripadvisor? Antecedents of trust towards consumer-generated media and its influence on recommendation adoption and word of mouth. *Tourism Management*, (51), 174+.

Floyd, M. F. (1997). Pleasure, arousal, and dominance: Exploring affective determinants of recreation satisfaction. *Leisure Sciences, 19*(2), 83–96.

Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: Lisrel and Pls applied to consumer exit-voice theory. *Journal of Marketing Research, 19*(4), 440–452.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39–50.

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences, 17*(6), 791–802.

García-Milon, A., Olarte-Pascual, C., & Juaneda-Ayensa, E. (2021). Assessing the moderating effect of Covid-19 on intention to use smartphones on the tourist shopping journey. *Tourism Management*, (87).

Gretzel, U., & Yoo, K.H. (2008) Use and impact of online travel reviews. *Information and communication technologies in tourism 2008*, pp. 35-46.

Gretzel, U., Fesenmaier, D. R., & O'leary, J. T. (2006). The transformation of consumer behaviour. In D. Buhalis & C. Costa (Eds.), *Tourism business frontiers: Consumers, products and industry* (pp. 9–18). Elsevier.

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets, 25*(3), 179–188.

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

Hirschman, E. C. (1980). Innovativeness, novelty seeking, and consumer creativity. *Journal of Consumer Research, 7*(3), 283–295.

Ho, C., Yuan, Y., Lin, Y., & Chen, M. (2015). Re-visiting tourism information search process: From smartphone users' perspective. *E-Review of Tourism Research, 6*, 1–5.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Sage.

Holloway, J. C. (2004). *Marketing for Tourism*. Pearson Education.

Hopf, J., Scholl, M., Neuhofer, B., & Egger, R. (2020) Exploring the impact of multisensory Vr on travel recommendation: A presence perspective. In *Information and communication Technologies in Tourism 2020*. Springer, pp. 169–180.

Huang, C.-Y., Chou, C.-J., & Lin, P.-C. (2010). Involvement theory in constructing Bloggers' intention to purchase travel products. *Tourism Management, 31*(4), 513–526.

Huang, W.-J., Norman, W. C., Hallo, J. C., Mcgehee, N. G., Mcgee, J., & Goetcheus, C. L. (2014). Serendipity and independent travel. *Tourism Recreation Research, 39*(2), 169–183.

Huang, C. D., Goo, J., Nam, K., & Yoo, C. W. (2017). Smart tourism technologies in travel planning: The role of exploration and exploitation. *Information & Management, 54*(6), 757–770.

Jang, S. S., & Feng, R. (2007). Temporal destination revisit intention: The effects of novelty seeking and satisfaction. *Tourism Management, 28*(2), 580–590.

Jansson, A. (2002). Spatial phantasmagoria the mediatization of tourism experience. *European Journal of Communication, 17*(4), 429–443.

Jeong, M., & Shin, H. H. (2020). Tourists' experiences with smart tourism technology at Smart destinations and their behavior intentions. *Journal of Travel Research, 59*(8), 1464–1477.

Jin, B., Park, J.Y., & Kim, J. (2008). Cross-cultural examination of the relationships among firm reputation, E-satisfaction, E-trust, and E-loyalty. International Marketing Review.

Jin, X., Wu, L., Becken, S., & Ding, P. (2016). How do worry, self-efficacy, and coping interact? Examining Chinese tourists to Australia. *Journal of China Tourism Research, 12*(3–4), 374–393.

Johnson, R. A., & Wichern, D. W. (2007). *Applied multivariate statistical analysis* (6th ed.). Pearson.

Kahn, B. E. (1995). Consumer variety-seeking among goods and services: An integrative review. *Journal of Retailing and Consumer Services, 2*(3), 139–148.

Kim, S., & Kim, H. (2015). Moderating effects of tourists' novelty-seeking tendencies on the relationship between satisfaction and behavioral intention. *Tourism Analysis, 20*(5), 511–522.

Kim, M.-J., Chung, N., & Lee, C.-K. (2011). The effect of perceived trust on electronic commerce: Shopping online for tourism products and Services in South Korea. *Tourism Management, 32*(2), 256–265.

Kim, H.-W., Xu, Y., & Gupta, S. (2012). Which is more important in internet shopping, perceived Price or trust? *Electronic Commerce Research and Applications, 11*(3), 241–252.

Kim, S.-E., Lee, K. Y., Shin, S. I., & Yang, S.-B. (2017). Effects of tourism information quality in social media on destination image formation: The case of Sina Weibo. *Information & Management, 54*(6), 687–702.

Kirova, V., & Thanh, T. V. (2019). Smartphone use during the leisure theme park visit experience: The role of contextual factors. *Information & Management, 56*(5), 742–753.

Koo, C., Chung, N., & Kim, H.-W. (2015). Examining explorative and exploitative uses of smartphones: A user competence perspective. *Information Technology & People, 28*(1), 133–162.

Koo, C., Park, J., & Lee, J.-N. (2017). Smart tourism: Traveler, business, and organizational perspectives. *Information & Management, 54*(6), 683–686.

Kozak, M. (2002). Comparative analysis of tourist motivations by nationality and destinations. *Tourism Management, 23*(3), 221–232.

Larsen, S., Brun, W., & Øgaard, T. (2009). What tourists worry about– construction of a scale measuring tourist worries. *Tourism Management, 30*(2), 260–265.

Law, K. S., & Wong, C.-S. (1999). Multidimensional constructs M structural equation analysis: An illustration using the job perception and job satisfaction constructs. *Journal of Management, 25*(2), 143–160.

Lee, T.-H., & Crompton, J. (1992). Measuring novelty seeking in tourism. *Annals of Tourism Research, 19*(4), 732–751.

Lee, C.-K., Lee, Y.-K., & Wicks, B. E. (2004). Segmentation of festival motivation by nationality and satisfaction. *Tourism Management, 25*(1), 61–70.

Lee, M., Lowry, L. L., & Delconte, J. D. (2015). Social media in tourism research: A literature review. In *Travel and tourism research*

association: Advancing tourism research globally. https://scholarworks.umass.edu/ttra/ttra2015/Academic_Papers_Visual/21

Lee, M., Hong, J. H., Chung, S., & Back, K.-J. (2021). Exploring the roles of Dmo's social media efforts and information richness on customer engagement: empirical analysis on Facebook event pages. *Journal of Travel Research, 60*(3), 670–686.

Lepp, A., & Gibson, H. (2003). Tourist roles, perceived risk and international tourism. *Annals of Tourism Research, 30*(3), 606–624.

Lieber, S., & Fesenmaier, D. (1985). Physical and social conditions affecting recreation site preferences. *Environment and Planning A, 17*(12), 1613–1625.

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology, 86*(1), 114–121.

Lord, F. M. (1963). Elementary models for measuring change. In C. W. Harris (Ed.), *Problems in measuring change*. University of Wisconsin Press.

Lowry, P. B., Gaskin, J., Twyman, N., Hammer, B., & Roberts, T. (2013). Proposing the hedonic-motivation system adoption model (Hmsam) to increase understanding of adoption of hedonically motivated systems. *Journal of the Association for Information Systems, 14*(11), 617–671.

Lui, Z. (2019). Internet tourism marketing: Potential and constraints. University of Strathclyde, Uk (2000).

Luo, Q., & Zhong, D. (2015). Using social network analysis to explain communication characteristics of travel-related electronic word-of-mouth on social networking sites. *Tourism Management, 46*, 274–282.

Mirsarraf, M., Ahmadpanah, A., Shairi, H., & Ghaffarimiab, I. (2018). The role of semiotics and pictorial metaphor in web Interface design. *International Journal of Arts*.

Money, R. B., & Crotts, J. C. (2003). The effect of uncertainty avoidance on information search, planning, and purchases of international travel vacations. *Tourism Management, 24*(2), 191–202.

Murray, K. B. (1991). A test of services marketing theory: Consumer information acquisition activities. *Journal of Marketing, 55*(1), 10–25.

Narangajavana Kaosiri, Y., Callarisa Fiol Luis, J., Moliner Tena Miguel, Á., Rodríguez Artola Rosa, M., & Sánchez García, J. (2019). User-generated content sources in social media: A new approach to explore tourist satisfaction. *Journal of Travel Research, 58*(2), 253.

Narangajavana, Y., Callarisa Fiol, L. J., Moliner Tena, M. Á., Rodríguez Artola, R. M., & Sánchez García, J. (2017). The influence of social Media in Creating Expectations. An empirical study for a tourist destination. *Annals of Tourism Research, 65*, 60–70.

Neal, J. D., Sirgy, M. J., & Uysal, M. (1999). The role of satisfaction with leisure travel/tourism services and experience in satisfaction with leisure life and overall life. *Journal of Business Research, 44*(3), 153–163.

Neuhofer, B., Buhalis, D., & Ladkin, A. (2015). Smart technologies for personalized experiences: A case study in the hospitality domain. *Electronic Markets, 25*(3), 243–254.

No, E., & Kim, J. K. (2015). Comparing the attributes of online tourism information sources. *Computers in Human Behavior, 50*, 564–575.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). McGraw-Hill.

Oliver, R. L. (1993). Cognitive, affective, and attribute bases of the satisfaction response. *Journal of Consumer Research, 20*(3), 418–430.

Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the consumer*. McGraw-Hill.

Otto, J. E., & Ritchie, J. B. (1996). The service experience in tourism. *Tourism Management, 17*(3), 165–174.

Pai, C.-K., Liu, Y., Kang, S., & Dai, A. (2020). The role of perceived smart tourism technology experience for tourist satisfaction, happiness and revisit intention. *Sustainability, 12*(16), 1–14.

Pai, C., Kang, S., Liu, Y., & Zheng, Y. (2021). An examination of revisit intention based on perceived smart tourism technology experience. *Sustainability, 13*(2), 1–14.

Pana, B., Lin, M. S., Liang, Y., Akyildiz, A., & Park, S. Y. (2021). Social, ethical, and moral issues in smart tourism development in destinations. *Journal of Smart Tourism, 1*(1), 9–17.

Park, S., & Stangl, B. (2020). Augmented reality experiences and sensation seeking. *Tourism Management, 77*, 104023.

Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS Quarterly, 31*(1), 105–136.

Pearson, P. H. (1970). Relationships between global and specified measures of novelty seeking. *Journal of Consulting and Clinical Psychology, 34*(2), 199.

Pizam, A., Jeong, G.-H., Reichel, A., van Boemmel, H., Lusson, J. M., Steynberg, L., Volo, S., Kroesbacher, C., Kucerova, J., & Montmany, N. (2004). The relationship between risk-taking, sensation-seeking, and the tourist behavior of young adults: A cross-cultural study. *Journal of Travel Research, 42*(3), 251–260.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903.

Prebensen, N. K., & Xie, J. (2017). Efficacy of co-creation and mastering on perceived value and satisfaction in Tourists' consumption. *Tourism Management, 60*, 166–176.

Quintal, V. A., Lee, J. A., & Soutar, G. N. (2010). Risk, uncertainty and the theory of planned behavior: A tourism example. *Tourism Management, 31*(6), 797–805.

Ringle, C. M., Wende, S., & Will, A. (2005). *Smartpls 2.0.M3*. SmartPLS.

Riquelme, H., & Kegeng, W. (2004). The unintended effects of hidden assumptions: Biases on the internet. *Online Information Review, 28*(6), 444–453.

Román, S. (2010). Relational consequences of perceived deception in online shopping: The moderating roles of type of product, consumer's attitude toward the internet and consumer's demographics. *Journal of Business Ethics, 95*(3), 373–391.

Sánchez-Cañizares, S. M., Cabeza-Ramírez, L. J., Muñoz-Fernández, G., & Fuentes-García, F. J. (2021). Impact of the perceived risk from Covid-19 on intention to travel. *Current Issues in Tourism, 24*(7), 970–984.

Schiffman, L. G., & Kanuk, L. L. (2000). *Consumer behavior*. Prentice Hall.

Sharma, S., & James, W. L. (1981). Latent root regression: An alternate procedure for estimating parameters in the presence of multicollinearity. *Journal of Marketing Research, 18*(May), 154–161.

Shin, H. H., Jeong, M., & Cho, M. H. (2021). The impact of smart tourism technology and domestic travelers' technology readiness on their satisfaction and behavioral intention: A C Ross-country comparison. *International Journal of Tourism Research, 23*(5), 726–742.

Siehl, C., Bowen, D. E., & Pearson, C. M. (1992). Service encounters as rites of integration: An information processing model. *Organization Science, 3*(4), 537–555.

Steinbauer, A., & Werthner, H. (2007). Consumer behaviour in E-tourism. In M. Sigala, L. Mich, & J. Murphy (Eds.), *Information and communication technologies in tourism* (pp. 65–76). Springer.

Steinmann, S., Kilian, T., & Brylla, D. (2014). Experiencing products virtually: The role of vividness and interactivity in influencing mental imagery and user reactions. In *Proceedings of the international conference on information systems*. Auckland.

Swan, J. E., & Combs, L. J. (1976). Product performance and consumer satisfaction: A new concept. *Journal of Marketing, 40*(2), 25–33.

Teas, R. K. (1993). Expectations, performance evaluation, and consumers' perceptions of quality. *The Journal of Marketing*, 18–34.

Toyama, M., & Yamada, Y. (2012). The relationships among tourist novelty, familiarity, satisfaction, and destination loyalty: Beyond the novelty-familiarity continuum. *International Journal of Marketing Studies, 4*(6), 10.

Tseng, A. (2017). Why do online tourists need sellers' ratings? Exploration of the factors affecting regretful tourist E-satisfaction. *Tourism Management, 59*, 413–424.

Tussyadiah, I. P., & Fesenmaier, D. R. (2009). Mediating tourist experiences: Access to places via shared videos. *Annals of Tourism Research, 36*(1), 24–40.

Ukpabi, D. C., & Karjaluoto, H. (2017). Consumers' acceptance of information and communications technology in tourism: A review. *Telematics and Informatics, 34*(5), 618–644.

Urry, J. (1990). *The tourist gaze: Leisure and travel in contemporary societies*. Sage Publications.

Volchek, K., Law, R., Buhalis, D., & Song, H. (2019). The good, the bad, and the ugly: Tourist perceptions on interactions with personalised content. *e-Review of Tourism Research, 16*(2-3), 62–72.

Volchek, K., Law, R., Buhalis, D., & Song, H. (2020). Exploring ways to improve personalisation: The influence of tourist context on service perception. *e-Review of Tourism Research, 17*(5), 737–752.

Wang, D., Park, S., & Fesenmaier, D. R. (2012). The role of smartphones in mediating the touristic experience. *Journal of Travel Research, 51*(4), 371–387.

Wang, Y.-C., Liu, C.-R., Huang, W.-S., & Chen, S.-P. (2019). Destination fascination and destination loyalty: Subjective well-being and destination attachment as mediators. *Journal of Travel Research*, 0047287519839777.

Werthner, H., & Klein, S. (1999). *Information technology and tourism - a challenging relationship*. Springer.

Werthner, H., & Ricci, F. (2004). E-commerce and tourism. *Communications of the ACM, 47*(12), 101–105.

Werthner, H., Alzua-Sorzabal, A., Cantoni, L., Dickinger, A., Gretzel, U., Jannach, D., Neidhardt, J., Pröll, B., Ricci, F., Scaglione, M., & Stangl, B. (2015). Future research issues in it and tourism. *Information Technology & Tourism, 15*(1), 1–15.

Williams, A. M., & Baláž, V. (2015). Tourism risk and uncertainty theoretical reflections. *Journal of Travel Research, 54*(3), 271–287.

Wu, T.-C., Lin, Y.-E., Wall, G., & Xie, P. F. (2020). A Spectrum of indigenous tourism experiences as revealed through means-end chain analysis. *Tourism Management, 76*, 103969.

Xiang, Z., & Gretzel, U. (2010). Role of social media in online travel information search. *Tourism Management, 31*(2), 179–188.

Xiang, Z., Wang, D., O'Leary, J. T., & Fesenmaier, D. R. (2014). Adapting to the internet: Trends in travelers' use of the web for trip planning. *Journal of Travel Research*, 0047287514522883.

Xiang, Z., Magnini, V. P., & Fesenmaier, D. R. (2015). Information technology and consumer behavior in travel and tourism: Insights from travel planning using the internet. *Journal of Retailing and Consumer Services, 22*, 244–249.

Xu, X., & Schrier, T. (2019). Hierarchical effects of website aesthetics on customers' intention to book on hospitality sharing economy platforms. *Electronic Commerce Research and Applications, 35*, 100856.

Yoo, K.-H., Lee, Y., Gretzel, U., & Fesenmaier, D. R. (2009). Trust in travel-related consumer generated media. *Information and Communication Technologies in Tourism 2009*, 49–59.

Yoo, C. W., Goo, J., Huang, C. D., Nam, K., & Woo, M. (2017). Improving travel decision support satisfaction with smart tourism technologies: A framework of tourist elaboration likelihood and self-efficacy. *Technological Forecasting and Social Change, 123*, 330–341.

Yuan, Y., Tseng, Y.-H., & Ho, C.-I. (2019). Tourism information technology research trends: 1990–2016. *Tourism Review*.

Zhang, H., & Xu, H. (2019). A structural model of liminal experience in tourism. *Tourism Management, 71*, 84–98.

Zhang, S.-N., Li, Y.-Q., Ruan, W.-Q., & Liu, C.-H. (2022). Would you enjoy virtual travel? The characteristics and causes of virtual tourists' sentiment under the influence of the Covid-19 pandemic. *Tourism Management, 88*.