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Explorative and Exploitative Use of Smart Tourism Technologies in Travel Planning

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ABSTRACT

The use of smart tourism technologies, such as travel-related websites, social media, and smartphones, in travel planning has been pervasive and growing. This study examines how travelers use these technologies to enhance travel satisfaction. By adopting the framework of exploration and exploitation, we find that the attributes of smart tourism technologies promote both explorative and exploitative use, while user's security and privacy concerns have a negative impact. Further, explorative use has a strong influence on overall travel experience satisfaction, and exploitative use mainly enhances the transaction satisfaction.

KEYWORDS: Smart Tourism Technologies; Smart Tourism; Travel Planning; Travel Experience; Exploration; Exploitation

INTRODUCTION

Internet and other information technologies have changed consumer behavior. In tourism, these technologies have played a critical role not only for the competiveness of tourism organizations but also for the experience of tourists. Today, the vast majority of travel information search and reservations and payments during the preparation phase of a trip is done over the Internet. A plethora of technology channels and providers, such as traditional destinations' or agencies' web sites, personal blogs, review sites, and social networks, have emerged as smart tourism technologies (STTs), and their impacts have been felt by all participants in travel and tourism, ranging from travel vendors to aggregation providers to information brokers to travelers themselves. Initially, smart tourism technologies have enhanced the efficiency of transaction-oriented functions such as reservation and payment. Although such transaction-related use is still important, travelers increasingly turn to this diverse array of technologies and channels to obtain more accurate, rich, comprehensive, and personalized information from the planning phase of travel to real-time experience [91]. As such, various complex marketing strategies have been developed to assist travelers in making more informed and effective decisions. For instance, the consumers' evaluation scores for hotel

performance provided by such sites as tripadvisor.com and booking.com significantly affect travelers' purchasing behavior [5,26].

With such a broad and deep impact of information technologies on travel, it is no wonder that there have been considerable research interests on smart tourism. In particular, a number of studies have been focused on the use of smart tourism technologies during planning phase of travel [e.g., 9,25,77,91,92]. While this stream of research has informed the various types of technologies used in travel and tourism and their attributes, a further examination of the underlying mechanism with which travelers use these STTs can greatly advance our understanding of the role that these technologies play in travel planning activities to achieve satisfaction. In this study, we borrow the powerful framework of exploration and exploitation, first adopted in the context of organizational learning and later extended to information technology use, to inspect the way that smart tourism technologies are used in travel planning. We intend to examine the following research questions: (1) How the attributes of STTs motivate the different use of STTs, and (2) How exploitative and explorative use of STTs influences travel experience satisfaction.

This paper is organized as follows. In the next section, we first review the previous research on smart tourism technologies and their role in travel planning. We then discuss the theory of exploration and exploitation and develop the research model based on this framework. The methodology of the study, as well as the result and analysis, are presented in the ensuing sections. Finally, we discuss the theoretical and practical implication of our research, and offer suggestions for future studies.

LITERATURE REVIEW

Travel Planning and Smart Tourism Technologies

Travel planning and decision making have been the subject of considerable research interests in recent past. Travel planning follows a series of episodes that involve a hierarchical structure of information searches [35,63]. Drawing from several previously proposed models, travel decision-making process can include the following phases: idea formation, searching for information, evaluate alternatives for final decision, and booking [6,36,38,75]. This process model is also consistent with six-stage search process proposed by Kuhlthau [44] and the behavior model of information seeking patterns proposed by Ellis [22]. It is worthwhile to note that travel plans are made in a number of stages, with earlier stages conditioning the later ones. As such, travel planning is not simply sequential; the travel decision process can be iterative with the four phases repeating or even running in parallel for each such decision as destination, itinerary, things to do, and so on [25,57].

STTs play an increasingly important role in all four phases of travel planning. It was predicted as early as the 1990s that the Internet would be accepted as the most important and effective tool to search travel information from the planning phase of travel [11]. Ho et al. [35] propose a conceptual framework of travelers' engagement in tourism information search and planning to understand their online and offline behavior and find prior knowledge and experience as the key basis for online travel information search. Xiang et al. [92] find users' perceived usefulness of the Internet for all categories of travel decisions such as where to visit, what to do, and where to stay has increased from 2007 to 2012. With the advent of new media such as social networks and smartphones, the focus of information search for travel decisions has been gradually shifting from only primary products (flights, lodging, etc.) to information to improve travel experience [17,87,90,92]. It is also noted, however, that travelers are concerned with the possible security or privacy breach with the increasing use of STT [73].

It is generally believed that certain underlying characteristics of STTs drive their higher adoption and usage in travel planning. Xiang et al. [92] posit that the increased popularity of the internet for trip decisions is because the Internet offers higher quality information and richer experience than ever. In the case of social media, the perceived value in travel information search goes up with users' perception of the information reliability and enjoyment [17]. And tourists have found smart phones to be useful in helping them visit more places, have richer experience, and enjoy higher satisfaction with their trips overall [87]. No and Kim [60] further theorize that four attributes of all online tourism information sources—accessibility, information reliability, interaction, and personalization—are key to travel planning (with security and privacy as a potential barrier). But although the factors of STTs leading to their use and usefulness are well studied, the underlying mechanism of how they are used successfully and/or satisfactorily for travel planning has not been examined. For that, we turn to the theory of exploration and exploitation.

Exploration and Exploitation Use

"Exploration of new possibilities" and "exploitation of existing capabilities" have long been recognized as two distinct mechanisms governing the learning and adaptive processes. March [56] points out that exploration refers to concepts as search, experimentation, discovery, and innovation, while exploitation is often associated with terms such as refinement, efficiency, implementation, and execution. Essence of exploration is the development of and experimentation with new alternatives, and exploitation focuses on improving existing resources and processes continuously [48]. Together, activities attributed to exploration and exploitation also constitute the essential course of adoption and use of information technology and systems [14,43].

The concepts of exploration and exploitation are often applied in the context of organizational learning. Recently, the conceptualization of exploration and exploitation has been extended from organizational to individuals learning and decision making. For individuals, exploitation is defined as a behavior that optimizes the performance in the current tasks, while exploration involves a deviation from existing tasks and a quest for alternatives [2]. Many contrasts in characteristics between exploration and exploitation organizational learning, such as slow vs. fast and experimenting vs. refining, also exhibit at the individual level. Burton-Jones and Straub [14] suggest that in information system adoption, exploitation is related to the execution of routines and existing knowledge, whereas exploration involves searching for new and different uses of the systems. In the case of smartphones, it is found that user competence and perceived usefulness are positively correlated with both exploitative and explorative use, while perceived usefulness is significant for exploitative use but not exploration use [43].

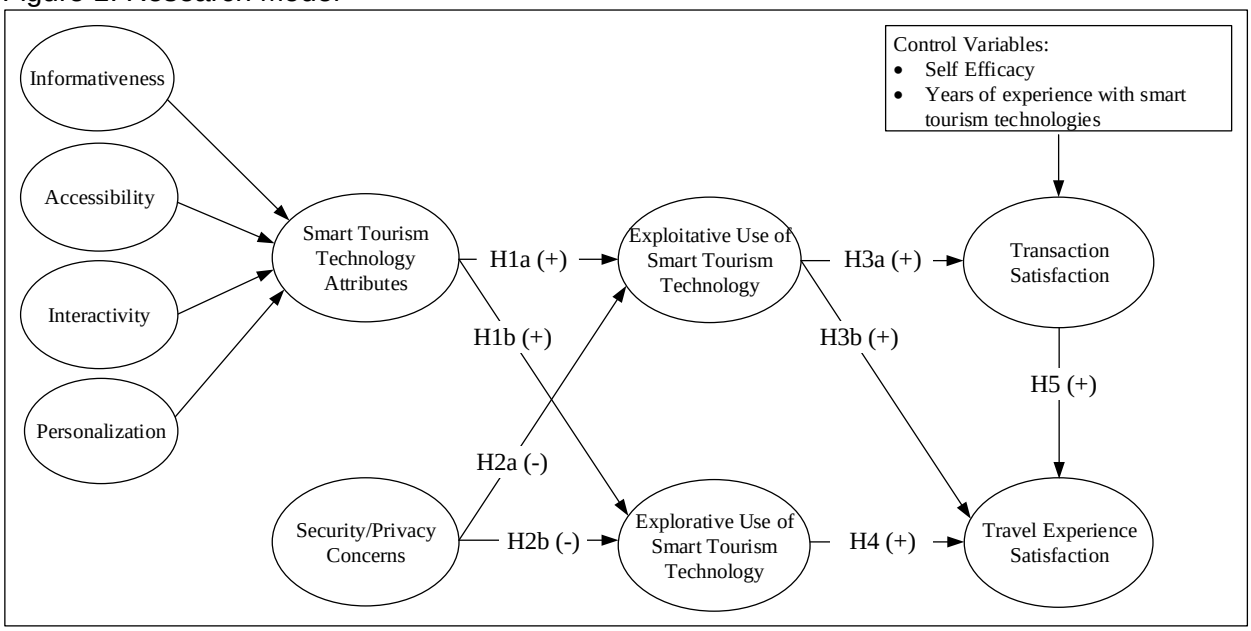
For this study, we conceptualize travelers' deployment of STT for trip planning as a combination of exploration and exploitation use. Considering the evolving nature of STTs, this study adopts the conceptual framework of exploration and exploitation in travel planning. We argue that although the use of STTs is involved in every stage of travel planning—idea formation, searching for information, evaluating alternatives for final decision, and booking—individuals interact with STT differently at different travel planning stages, and such differences bring about differentiated consequences. Using STTs to perform the tasks of idea formation and searching for information in the first two phases of the travel decision making process represents explorative use. Such use involves mostly unstructured tasks that require searching, testing, and discovery and takes time to learn and adapt. For instance, finding "potential destinations to visit" and "stores or other places to shop" on the Internet garners moderate but increasing attention by travelers [92]. When successful, such explorative use of STTs would likely enhance the overall experience of travelers. On the other hand, using STTs to complete

the tasks of evaluating alternatives and booking of travel products in the last two phases travel planning, which has been well adopted by travelers, represents exploitative use. Xiang et al. [92] find that more than two-thirds of the travelers surveyed in 2007 to 2012 used Internet for searching "information about a particular destination," "hotel prices or places to stay," and "airline fares and schedule/flight time." These activities, involving routine tasks of selecting vendors and aiming at improving transaction efficiency, represent exploitative use of STTs for travel planning. With these two different styles of STT use that travelers engage in during the travel planning process, we present the research model in the next section.

HYPOTHESES/MODEL

Our research model, which examines core antecedents that influence overall travel experience satisfaction with STT use, is presented in Figure 1. Because this study investigates the use of a specific category of information technology (i.e., the STTs), we include the factors that identify the STTs and influence the two different STT uses. Based on the prior literature, key STT attributes and security/privacy concerns are adopted as core antecedents of exploitive and explorative use of STT [60]. In the model, we posit that the former positively promotes the STT use, and the latter rather inhibits the STT use. We also argue that the exploration and exploitation use of STTs contributes to the transaction satisfaction and overall travel experience satisfaction, respectively. Detailed arguments that support these relationships are discussed below.

Figure 1. Research Model



STTs can be identified by four key attributes—informativeness, accessibility, interactivity and personalization—that can enhance the usability and perceived usefulness of the technologies [60]. Informativeness is a combination of the information quality and trust of information as provided by online tourism information sources. Accessibility is the degree to which travelers can easily access and use online tourism information sources. Interactivity facilitates travelers' immediate actions when using STTs via real-time feedback and active communications. And personalization represents the ability of a traveler to obtain specific

information to suit his/her personal trip planning needs. In this study, we investigate how these multiple attributes collectively motivate different uses of STTs.

Informativeness is particularly important to exploitative use of STTs: To select and book primary travel products such as air tickets, hotels, and car rentals effectively, travelers need to understand what relevant information to find, where to get the best deals, and how to start a conversation with other travelers on the Internet [91]. Furthermore, the quality and reliability of information have a positive effect on their perceived value [17], resulting in more use for making selection and purchases via e-commerce means [89]. The degree to which travelers can access useful information (accessibility) is associated with usability of STTs [13,47,92], and this perceived ease of use facilitates the search for travel ideas (i.e., explorative use) [43] and enables users to complete transactions easily (i.e., exploitative use). The interactivity of STTs provides more relevant and credible information due to the active participation of users [93], helping users construct initial ideas about travel and enabling efficient travel information search. Besides, travelers are likely to use interactive sites because of the experience of cognitive and affective absorption [86]. Chung and Koo [17] has found that the user enjoyment and absorptive experience from the interactivity of STTs such as social media leads to higher level of perceived value and consequently more usage. Personalization allows for tailor-made services to fit individual traveler's needs and thus increases the perception of service quality [55,60]. In addition, personalized travel planning using STTs allows for complex travel products [89] and increasingly important exploratory activities such as on-the-fly travel decisions [88] . Therefore, we propose the following hypotheses:

H1a *STT attributes are positively associated with the exploitative use of STTs for travel planning.*

H1b *STT attributes are positively associated with the explorative use of STTs for travel planning.*

User's concern for security and privacy is a factor that can impact the use of STTs. The ability to protect user's information and to provide secure transactions is a key evaluation factor for travelers to choose the right website for travel planning [65]. Although security and privacy are no longer a major road block against the use of information technology, they are still listed as the number one reason for not using the Internet for travel planning [92]. For example, concerns of possible security or privacy intrusion can discourage users to use vendor sites or blogs. Such concerns are likely to be more pronounced in the case of exploitative, since much more sensitive information such as personal identification and credit card data is transmitted in the last two stages of travel planning. Therefore, we have the following hypotheses:

H2a *Security and privacy concerns are negatively associated with the exploitative use of STTs for travel planning.*

H2b *Security and privacy concerns are negatively associated with the explorative use of STTs for travel planning.*

As exploitation is generally associated with execution and refinement of routines, the exploitative use of information technologies tends to lead to short-term task performance and efficiency gains [14,49,56]. Exploitative use of STTs in travel planning refers to the evaluation and purchase of travel products, and, as such, the performance gains of such use are due to the incremental improvement over the traditional processes of searching and booking with online and mobile means [35]. Indeed, trip transactions have been a leading application of e-commerce, partially due to such exploitative use of STTs being better and more efficient in accomplishing travelers' planning needs [89]. And travelers have found STTs very useful or essential in selecting destinations or products and completing transactions [92]. When travelers can make better decisions and complete smoother transactions in the last two stages of travel

planning, it is likely then that they are more satisfied with the whole trip experience, although the impact may not be as high as transaction satisfaction. Therefore, we propose the following hypotheses:

H3a *Exploitative use of STTs for travel planning is positively related to transaction satisfaction.*

H3b *Exploitative use of STTs for travel planning is positively related to travel experience satisfaction.*

Explorative use of STTs in travel planning focuses on generating trip ideas and searching for relevant information. Although this type of innovative ways of using technologies is not likely to generate process-specific results, there are other benefits to be gained [56,79]. As the use of Internet for searching and booking the primary travel product has reached saturation, travelers increasingly find values in using the Internet to search for secondary products such as museum tickets and shopping detour to enhance the trip experience [91]. Other STTs such as social media and smartphones allow for a richer, deeper, and more interactive research on various aspects of a trip [32,87]; the result of such explorations may include an exotic destination, an off-the-beaten-path tour, or even an on-the-go itinerary, all of which can enhance the overall travel experience in a novel, non-traditional way. Note that since explorative use of STTs does not involve in the e-commerce activities of searching for and booking travel products, it is not likely to directly influence the transaction satisfaction of a traveler. Therefore, we have the following hypothesis:

H4 *Explorative use of STTs for travel planning is positively related to travel experience satisfaction.*

The transactions of making reservations and bookings are part of the overall travel experience. As pointed out in prior literature, service quality leads to a satisfaction of the service, which in turn influences the satisfaction of the overall experience of which the service is a part of [4,59,62] . Therefore, it is perceivable that a better experience in travel transactions would lead to a better experience of the whole trip, and we argue for the following hypothesis:

H5 *Transaction satisfaction is positively related to travel experience satisfaction.*

METHODS

We administered a survey to one of the largest online travel clubs in Korea. To expedite the data collection process, we developed a web survey, which consisted of 9 demographic items, 26 questions with seven point Likert scale, and 18 Boolean type questions. A pilot test with 30 graduate students was performed to ensure that the questions were unambiguous and that there were no technical errors which might impede data collection. After the pilot study, a small number of questions were refined to improve their clarity. Next, with the support of the club administrator, an invitation to participate in the survey was posted as a notice on the general notice section. Two follow-up ‘‘reminder’’ invitations were then posted one week apart. A total of 325 responses were received, of which 319 responses were valid and thus used for the further analysis. This represented a 5.43% response rate. Although this response rate is low, we were satisfied with the results because (1) the average ratio of the traffic in past 30 days to the total number of the registered members to the club was just little over 20%; (2) no financial incentive was offered to the respondents for completing the survey; and (3) the club members surveyed did not know the researchers. The only incentive offered for completing the survey was that the club as a whole would receive a summary project report. The participants

were assured that the results would only be reported in an aggregated form to guarantee their anonymity and confidentiality [69].

A summary of the demographic characteristics of 319 responses is provided in Table 1. 72.1% of the respondents in the sample have more than one year of experience in using STTs, and about 98% of the respondents in the sample make one or more trips per year, indicating a good representation of STT user community. Further, the responses were based on a past trip with an average duration of 6.6 days. 39.5% of respondents in the sample spent one or two weeks for planning the trip.

Table 1. Demographic Characteristics of Respondents (N=319)

Characterisitcs		**Frequency**	**Percent**
Days of Trip Planning	less than one day	43	13.5%
	2-3 days	97	30.4%
	4-7 days	82	25.7%
	8-14 days	44	13.8%
	15-30 days	30	9.4%
	more than 30 days	23	7.2%
Number of leisure trip per year	never	5	1.6%
	1-2	186	58.3%
	3-4	84	26.3%
	5 or more	44	13.8%
Years of smart tourism technology use	less than 1 year	89	27.9%
	1 years ~ 2 years	82	25.7%
	2 years ~ 3 years	45	14.1%
	More than 3 years	103	32.3%
Education level	Middle school or less	8	2.5%
	High school	41	12.9%
	College/University	164	51.4%
	Graduate school	106	33.2%
Sex	Male	172	53.9%
	Female	147	46.1%
Average duration of the trip chosen for the survey		6.6 days	

All constructs in the survey were measured using multi-item scales. A conscientious effort was made to adapt existing measures validated from prior studies for the latent constructs in this research. Antecedents (i.e., smart tourism technology attributes and security/privacy concerns constructs) to both exploitative and explorative use of STTs was measured with seven-point Likert rating systems, ranging from 1 being strongly disagree to 7 being strongly agree. Following the literature survey studies, on the attributes or properties of online tourism information sources [60,65], we adopted the five most widely used factors: (1) informativeness, (2) accessibility, (3) interactivity, (4) personalization, and (5) security and privacy. While the tourism literature suggests that the first four attributes of STTs would have the positive impact on the tourism overall, the security and privacy issue in the tourism literature is identified as risk

or nuisance of online channels. Thus, we drew a line between these two seemingly opposite characteristics of the attributes to bring differential impacts to exploitative and explorative use of STTs.

Seven items were used to capture the breadth and frequency of exploitative use of STTs. These items cover a variety of aspects related to the extent to which the STTs were used for the trip planning experiences including comparison shopping and reservation/payment activities for traditional travel products such as air tickets, lodging, and rental car. These are the activities associated with the last two stages of travel planning (see Section 2.3). Eleven items were used to capture explorative use of STTs, which corresponds to active search and discovery of information in pre-trip travel planning. As such, these measures are to capture a collective use of STTs in the first two stages of travel planning, such as when choosing a destination to visit [27,91] and build expectations for the upcoming trip [31].

Consistent with the research on leisure satisfaction in travel and tourism [cf., 51,59,80], the distinction between instrumental attribute (as being more cognitive-oriented and thus derived from services and activities related to preparation and reservation) and expressive attribute (as being more emotion- or feeling-oriented and thus derived from visual perspective and preference) was maintained in our model of satisfaction. Thus, the differentiation between the travel transaction and the travel experience of satisfaction corresponds to the distinction between instrumental and expressive attributes of satisfaction. Four items for transaction satisfaction and five items for travel experience satisfaction were adopted from Neal et al. [59]. We operationalized both constructs following the method used by Baker and Crompton [4]. Specifically we employed a subjective disconfirmation measure [83] for both transaction and travel experience satisfaction requiring respondents to assess perceptions of satisfaction directly against their desired satisfaction level (defined as the level of satisfaction a traveler desires for the trip) and to record their evaluation with a single score. Instead of using the psychometric measure subject to the criticism of needing to go through the process of subtracting one measurement (expectations) from another measurement (perceptions) in order to compute the actual satisfaction [c.f., 10,20,53,81], we resorted to directly measure a respondent's perception of the level of satisfaction against an expectation standard.

To control for other contextual variables that could also influence the transaction satisfaction, we included the following two control variables in our model: years of experience with smart tourism technologies and self efficacy. Years of experience with STTs was measured in four different levels, while the self efficacy was measured with three items using 7-point Likert scale.

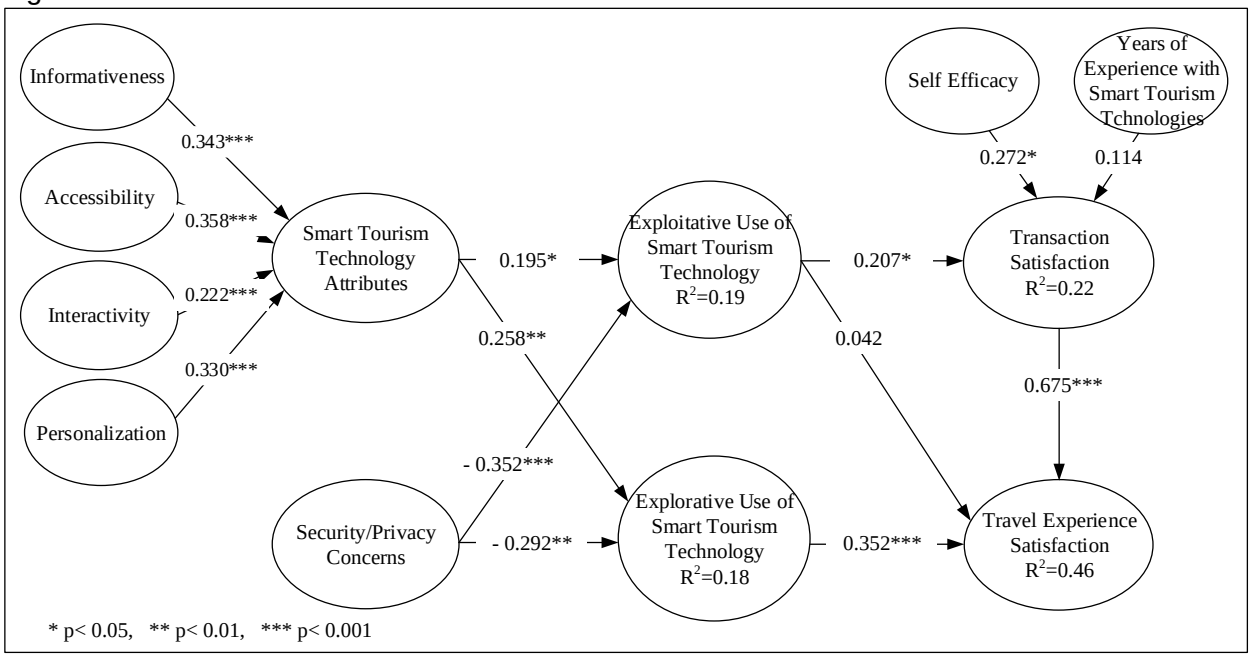
RESULTS

The Partial Least Squares (PLS) method implemented in SmartPLS was chosen to perform a simultaneous evaluation of both the quality of measurement (the measurement model) and hypothesized relationships (the structural model). The PLS technique is appropriate and well-suited for this study because it allows for latent constructs to be modeled with formative indicators in the structural model. The measurement model was assessed through tests of convergent validity, discriminant validity, and reliability. First, exploratory factor analysis (EFA) was performed to check the potential latent factors in the development of measures. We found eight factors that have above 0.7 factor loadings. These results support the unidimensionality of the scales in question. Internal consistency was assessed by using Cronbach's alpha. All constructs employed in this study are higher than 0.75, showing strong reliability [61]. Next, we evaluated convergent validity by testing composite reliability and average variance extracted (AVE) from the measures [40]. Composite reliability values were greater than 0.85, Cronbach's alpha was greater than 0.75, and AVE ranged from 0.65 to 0.89.

These results indicate that the measurement model has high internal consistency and that convergent validity is confirmed [29].

Having validated the measurement modeling, the next step was testing the hypothesized relationships among latent constructs in the structural model. The assessment and estimation of structural model was conducted using SmartPLS [70]. In order to determine the precision of estimation in this particular PLS effort, a bootstrapping procedure with resampling of 200 subsamples was used to determine the statistical significance of the parameter estimates. Based on the results of this procedure, the structural model was assessed examining the magnitude, statistical significance of the path coefficients, and R2 in the structural model. Overall, the results suggest a satisfactory fit of the model to the data. The R2 values of the dependent constructs were 0.46 and 0.22 for travel experience satisfaction and transaction satisfaction, respectively. In addition to evaluating the R^2 value of the endogenous constructs were 0.19 and 0.18 for exploitative use of STT and explorative use of STT, respectively. The results of the PLS analysis are in Figure 2.

Figure 2. Results of the structural model



We first note that explorative use of STTs was significantly and positively associated with travel experience satisfaction (β=0.352, p<0.001), supporting H4. The results of exploitative use of STTs were mixed. Exploitative use of STTs was significantly and positively associated with the transaction satisfaction (β=0.207, p<0.05), supporting H3a. However, for travel experience satisfaction, it showed statistically insignificant, albeit a positive association with travel experience satisfaction. Thus H3b was not supported. The possibility of these interesting results is discussed in the next section.

Second, the relationships between both styles of use and their antecedents turned out as expected. Smart tourism technology attributes was significantly and positively associated with both exploitative use (β=0.195, p<0.05) and explorative use (β=0.258, p<0.01) of STT, supporting H1a and H1b, respectively. As hypothesized, the effect of security and privacy concerns on both exploitative and explorative use of STT turned out to be negative and significant, supporting H2a (β= -0.352, p<0.001) and H2b (β= -0.292, p=0.01). These results indicate that multitude properties of STTs have a differential impact on the traveler's

consumption style of STTs before and during their trips. Specifically, while STT attributes stimulate the travelers to engage in both explorative and exploitative use, the traveler's concerns of security and privacy with online tourism technologies hinders both styles of STT use. As expected and controlled, self-efficacy showed a significant and positive impact on the transaction satisfaction ($\beta=0.272$, $p<0.05$).

To ensure that our statistical tests above have adequate power, we performed a power analysis to calculate power values for our PLS model using Cohen's [19] power table for multiple regression analysis. As PLS estimates a structural model block by block, we calculated power values block by block [cf., 50]. Because the transaction satisfaction block involves control variables, we took a hierarchical approach to analyze power for incremental explanation of variance, as suggested by Cohen [19]. Thus we conducted nine power analyses. The power values for all these analyses ranged from 0.88 to 0.96 indicating that our sample provides sufficient power at the 0.95 level to detect effects when they are present [19]. As the results are validated, we will discuss the implications of this study in more detail in the next section.

DISCUSSION AND CONCLUSIONS

Given the central role of smart tourism technologies in travel planning, it is important to understand how travelers actually use STTs and the consequences of such usage. We explore the different types of STT use and have revealed several significant and interesting findings. First, our result indicates that explorative use is a strong predictor of travel experience satisfaction ($\beta=0.352$, $p<0.001$). Knowing that such use is employed in the idea formation and information search stages of travel planning, we can interpret this result in two ways. Because finding the right destinations, places to visit, and itinerary is a critical aspect of travel experience, using STTs for this purpose understandably has a great impact on the overall travel satisfaction. Interestingly, we find that exploitative use, an important determinant of transaction satisfaction ($\beta=0.207$, $p<0.05$), only indirectly impacts the overall travel experience through transaction satisfaction. Because the exploitative use of STTs is associated directly with the evaluation of travel products and booking, the last two stages of travel planning, the result of such use is therefore a more efficient and smoother transaction, which in turn contributes to the overall travel experience.

Second, this study explores the role of STT attributes in motivating the exploitative and explorative use of STTs. Although No and Kim [60] identify four factors relevant to the usefulness of STTs, how they actually facilitate STT use by travelers to achieve overall travel experience satisfaction is not known. Our results show that the STT attributes contribute to travelers' adoption of STTs in travel planning, and the influence is stronger on explorative use than on exploitation. This may be explained by the fact that the travelers' exploitation use of STTs is already common and saturated [88], while the exploration use is still emerging and growing [91]; higher level of informativeness, accessibility, interactivity, and personalization can better motivate travelers to experiment with STTs in travel planning in innovative ways such as discovering exotic destinations and finding places to visit on-the-go.

Third, this study shows that security and privacy are still a concern to travelers when using STTs in travel planning. Security and privacy concerns have been examined as a critical factor that hinders online transactions or information disclosure [e.g., 21], but this study points out specifically that these concerns negatively impact both explorative and exploitative use of STTs in all stages of travel planning. It is interesting to note that travelers are concerned with security and privacy even when they explore the online information channels in idea formation and information search, although the negative impacts are not as strong as in the case of exploitative use, which often involves exchange of private information and financial transactions.

As with all research, this study has limitations that must be recognized. A potential limitation concerns the nature of the sample utilized in this analysis. While the sample shows good representation of travelers, these findings can only be generalized to STT users within the sampling frame. Thus, no claim of external validity for this study's findings, particularly in cases of non-leisure travels, can be made. Another limitation is the cross-sectional design employed in this research. Although the results provide strong support for the hypotheses, our model could benefit from a longitudinal research design to provide strong inferences for causality relationships for travel experience from a temporal perspective [30,39]. This is particularly useful because of the fast changing nature of STTs. Future studies can consider designing a longitudinal study to assess the style over time as the combination of available STTs and their attributes evolve.

Despite the limitations described above, our study adds to the stream of literature on smart tourism and smart tourism technologies. The goal of this paper is to identify the mechanism of the actual usage of STTs in travel planning and to understand how the different uses impact the travel experience, and the result shows the close relationships between STT attributes, exploration and exploitation use, and travel satisfaction. Therefore, we believe that this current study contributes to the advancement of our understanding of smart tourism technologies in travel planning, and future extensions to this theme can be expected.

REFERENCES

Will be provided upon request.