Deciphering the mystery of smart tourism technostress: revealing senior tourists' smart tourism avoidance behaviors

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Abstract

This research utilizes the Stressor-Strain-Outcome theory to explore the impact of senior tourists' experience of technostress, travel-related strains, and their behaviors of avoiding smart tourism technologies (STTs). The findings reveal that four different kinds of smart tourism technostressors have a notable influence on the avoidance behaviors of senior tourists towards smart tourism, and these direct relationships are mediated by travel anxiety, travel fatigue, and travel technophobia. Additionally, smart device literacy plays a moderating role in shaping smart tourism avoidance behavior. These results enhance our comprehension of the harmful effects of STTs on senior tourists and offer practical insights for the acceptance, development, and long-term viability of STTs.

Keywords: technostressors; stressor-strain-outcome (S-S-O) theory; smart device literacy; travel strain; travel anxiety (TA); travel fatigue (TF); travel technophobia (TTP); avoidance behavior;

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1.Introduction

Smart tourism technologies (STT), such as online travel websites, smartphone applications, and destination infrastructure, have deeply penetrated the tourism and hotel industry, bringing numerous conveniences to tourists while also posing challenges (Wang et al., 2023). As an increasingly significant and expanding group within the tourism market, the use of smart devices by senior tourists during their travels and related issues deserves attention (Wen et al., 2020). Statistics indicate that in 2020, In China, the population segment aged 60 and above stands at 264 million, which is 34.8% of the total population (National Health Commission of China, 2021). In 2022, older tourists aged 60 and above comprised approximately 27% of the domestic tourism market (China Tourism Academy, 2022). With technological innovations in the tourism and hotel industry, senior tourists are compelled to use smart devices. However, due to declines in their multisensory abilities, they face limitations in cognitive resources, information processing speed, attention span, and concentration (Aggarwal et al., 2024), potentially experiencing technical stress when using smart technologies to plan their vacations.

Technostress refers to the psychological and emotional tension individuals experience when interacting with technology (Tarafdar et al., 2020). In the context of smart tourism, older tourists may encounter difficulties when using smart devices and applications. Learning new skills and adapting to new interfaces can stress them (Shi et al., 2024). This stress can impact on their psychological well-being and tourism experience (Nimrod, 2018). When coping with technical stress, older tourists may exhibit avoidance behaviors, such as actively reducing or avoiding the use of STT and opting for traditional methods for travel planning and bookings. This could lead to a digital divide within the tourism and hotel industry (Lee et al., 2023).

Smart technologies have garnered increasing attention in tourism research. However, existing studies have two main limitations. Firstly, they mostly emphasize the positive impacts of STT while neglecting the potential stress it imposes on certain groups, particularly older tourists (Chen et al., 2022). Secondly, research on user technical stress has predominantly focused on the workplace, lacking sufficient empirical studies on technical stress and its impacts among older tourists in tourism and hotel contexts (Kumar et al., 2022). This study aims to bridge these gaps by constructing a framework to understand the psychological and behavioral responses of older tourists to STT stressors, exploring four types of technical stressors and avoidance behaviors, and analyzing the moderating role of smart device literacy.

2.Theoretical framework and hypothesis

2.1.The S-S-O framework

The S-S-O framework, which stems from the Person-Environment (P-E) fit theory, posits that a disparity or incongruence between an individual and their surroundings gives rise to stress and consequent strain (Ma et al., 2022). Stressors are stimuli that individuals perceive as problematic and potentially arduous, while strain pertains to the detrimental effects on an individual's physical and psychological well-being and emotions (Ma

et al., 2022). Outcomes are the long-term ramifications resulting from persistent stress and strain (Ma et al., 2022). This theory has garnered attention in investigations of employees' technostress, albeit lacking in unified benchmarks. The present study extends it to the realm of smart tourism to explore the associated circumstances of senior tourists. Given that this theory is germane to the study of smart technology user behavior and can elucidate the stress induced by smart technology, it is employed to dissect the influence of smart technology stressors on the avoidance behavior of senior tourists.

2.2. Smart Tourism Technology and Technological Stressors

STT encompasses a diverse array of travel technologies. Although copious research has been dedicated to its favorable impacts on tourist experiences and the like, the exploration of technostress within smart tourism remains scant. Technostress denotes the condition of struggle in adapting to novel computer technologies. The research on technostress among employees in the tourism and hospitality sectors is on the rise, yet that of senior tourists has been largely overlooked. This study conceives the concept of smart tourism technostressors, defined as the incapacity to handle STT, and adopts the four dimensions (techno-overload, techno-invasion, techno-complexity, and techno-uncertainty) proposed by Tarafdar et al. (2007) to gauge the perceived technostress of senior tourists regarding STT. For instance, STTC entails learning new technologies, STTI implies the intrusion of technology into personal life, STTO represents information fatigue, and STTU signifies the difficulty in grasping technical knowledge.

2.3. Travel Strain (TS)

Travel strain alludes to the adverse emotional responses of tourists towards tourism services, comprising travel anxiety (TA), travel fatigue (TF), and travel technophobia (TTP). TA is intertwined with all phases of travel planning and is influenced by service technologies; TF encompasses fatigue from long-distance travel and mental exhaustion stemming from technology utilization; TTP is the dread of tourism-related technologies. Grounded on relevant theories and literature, it is postulated that smart tourism technostressors will precipitate these psychological strains in senior tourists, thereby leading to the formulation of hypotheses H1 - H4.

H1: The complexity of smart tourism technology has a positive effect on travel anxiety (H1a), travel fatigue (H1b), and travel technophobia (H1c).

H2: The invasion of smart tourism technology positively affects travel anxiety (H2a), travel fatigue (H2b), and travel technophobia (H2c).

H3: The overload of smart tourism technology positively influences travel anxiety (H3a), travel fatigue (H3b), and travel technophobia (H3c).

H4: The uncertainty of smart tourism technology has a positive impact on travel anxiety (H4a), travel fatigue (H4b), and travel technophobia (H4c).

2.4. Smart Tourism Avoidance Conduct (STAB)

STAB designates the behavior of tourists purposefully shunning the use of STT. The motives for senior tourists to display STAB encompass unfamiliarity with technology, perceived complexity, physical constraints, and apprehension of operational blunders. According to the Technology Acceptance Model, technology that is difficult to use or associated with anxiety, fatigue, and fear can trigger avoidance behavior. Technology overload during travel and other factors can impel tourists to avoid technology, thus giving rise to hypotheses H5a - H5c.

H5a: Travel anxiety exerts a positive influence on the avoidance behavior of smart tourism.

H5b: Travel fatigue has a positive effect on the avoidance behavior of smart tourism.

H5c: Travel technophobia plays a positive effect on the avoidance behavior of smart tourism.

Based on the S-S-O theory, smart tourism technostressors are the stressors, travel anxiety and related factors are the strains, and smart tourism avoidance behavior is the outcome variable. The negative emotions engendered by technostress can impact technology use behavior, consequently leading to the further postulation of hypotheses H6 - H8.

H6: Travel anxiety serves as a positive mediator in the connection between (a) the complexity of smart tourism technology, (b) the invasion of smart tourism technology, (c) the overload of smart tourism technology, (d) the uncertainty of smart tourism technology, and the behavior of avoiding smart tourism.

H7: Travel fatigue acts as a positive mediator in the relationship among (a) the complexity of smart tourism technology, (b) the invasion of smart tourism technology, (c) the overload of smart tourism technology, (d) the uncertainty of smart tourism technology, and the behavior of avoiding smart tourism.

H8: Travel technophobia plays a positive mediating role in the association between (a) the complexity of smart tourism technology, (b) the invasion of smart tourism technology, (c) the overload of smart tourism technology, (d) the uncertainty of smart tourism technology, and the behavior of avoiding smart tourism.

2.5. The Moderating Role of Smart Device Literacy (SDL)

Technological literacy pertains to an individual's proficiency in using technology, and smart device literacy is an offshoot of it, encompassing the knowledge and skills requisite for operating smart devices. Previous research has established the significance of technological literacy in leveraging smart technologies, yet there is a dearth of research on the moderating impact of SDL in the relationship between travel strains and senior tourists' avoidance of smart tourism technologies. Thus, the following hypotheses are proposed based on the SSO framework.

H9a: SDL mitigates the impact of travel anxiety on the avoidance of smart tourism technology.

H9b: SDL reduces the influence of travel fatigue on the avoidance of smart tourism technology.

H9c: SDL lessens the effect of travel technophobia on the avoidance of smart tourism technology.

2.6. The Moderating Role of Smart Digital Mindset (SDM)

Derived from digital mindset and growth mindset, this study conceptualizes smart digital mindsets as individuals' mentality of being open to learning and willing to update their knowledge and skills to adapt to the popularity of smart technologies and the rapidly changing digital environment. Previous research has established the importance of digital mindset in leveraging digital technologies (Alabdali et al., 2024). However, there is a lack of studies on the effect of SDM on senior tourists' avoidance of smart tourism technologies. This study aims to explore the moderating effects of SDM in the relationship between travel strain and travel technology avoidance within the SSO framework. Thus, hypotheses H10a – H10c are proposed below.

H10a: SDM mitigates the impact of travel anxiety on the avoidance of smart tourism technology.

H10b: SDM reduces the influence of travel fatigue on the avoidance of smart tourism technology.

H10c: SDM lessens the effect of travel technophobia on the avoidance of smart tourism technology.

3.Research method and results

The survey for this study comprised ten constructs and 39 items, sourced from prior validated STT studies. Measurements were adapted for smart tourism. For example, smart tourism technostressors used a modified scale from Lee et al.(2023). After a pilot test with ten Chinese seniors (rewording four questions), it was distributed online via Credamo with purposive sampling. Respondents got a $10 coupon. Screening by age and STT experience left 458 valid surveys (54.59% male, 60 - 80 years, as shown in Table 1).

Table 1. Demographic characteristics of respondents ($N = 458$).

Variables		*N*(valid)	Percentage (%)
Gender	Male	250	54.59
	Female	208	45.41
Marital status	Unmarried	277	60.48
	Married	181	39.52
Age	60-69 years	216	47.16
	70-79 years	151	32.97
	80 and above	91	19.87
Level of education	Junior high school or below	167	36.46
	High school	103	22.49
	College or university	101	22.05
	Graduate school or above	87	19.00

3.1 Structural Model

Before validating the model, the reliability, validity, and internal consistency of the constructs were examined. The Skewness and Kurtosis of the measured items were within the acceptable range of +2, suggesting a normal distribution of the data. Cronbach's alpha was used to measure the reliability of the nine constructs, and all values exceeded 0.70, indicating good internal consistency. Composite Reliability (CR) was also examined, and all values were above 0.70. Confirmatory factor analysis was performed, and the results showed that the x2/df ratio was 3.70 (less than the threshold of 5.0), and other fit indices (CFI = 0.98, GFI = 0.90, etc.) indicated an excellent fit of the model. The factor loadings of all items were above 0.50, and the Average Variance Extracted (AVE) values ranged from 0.57 to 0.79 (exceeding 0.50), suggesting convergent validity. The discriminant validity was assessed using the Fornell - Larcker method and the HeteroTrait–MonoTrait ratio (HTMT), and the results showed that the construct - correlations were within the appropriate range, indicating discriminant validity.

3.2 Hypothesis Testing

Partial least squares SEM (PLS - SEM) and hierarchical regression analysis were used to test the hypotheses. Common Method Bias (CMB) and multi-collinearity were examined using SPSS. The Harman's single - factor test showed that there was no CMB. The variance inflation factor (VIF) values were less than three, indicating no multi - collinearity. The results of the structural model showed that the model fit well with the data ($x2/df$ = 4.39, RMSEA = 0.08, etc.). The analysis of the relationships between variables supported most of the hypotheses. For example, smart tourism techno - complexity (STTC), techno - invasion (STTI), techno - overload (STTO), and techno - uncertainty (STTU) had significant positive effects on travel anxiety (TA) in different degrees, supporting H1a - H4a. STTC, STTI, and STTO had positive effects on travel fatigue (TF), while STTU had no significant effect, supporting H1b - H3b and not H4b. STTC, STTO, and STTU had positive effects on travel technophobia (TTP), while STTI had no significant effect, supporting H1c, H3c, and H4c and not H2c. TA, TF, and TTP had significant positive effects on smart tourism avoidance behavior (STAB), supporting H5a - H5c. The mediating effects of travel anxiety, fatigue, and technophobia between smart tourism technostressors and STAB were all significant, supporting H6 - H8. The moderating effect of smart device literacy (SDL) was significant on the relationships between TA and STAB and between TTP and STAB, but not on the relationship between TF and STAB, supporting H9a and H9c and not H9b. The moderating effects of SDM were significant on the relationship between TS and STAB, supporting H10a, H10b, and H10c.

4.Discussion

The study empirically extended the four types of technostressors (STTC, STTI, STTO, and STTU) to the smart tourism context. The findings are consistent with previous studies on the negative consequences of

technostress. The four dimensions of technostressors were found to be antecedents of TA, TF, and TTP. However, the influence of STTI on TTP was insignificant, possibly because participants were not aware of the STT invasion. And there was no positive effect of STTU on TF, which may be due to the uncertainty of STT being a reality regardless of its direct impact on TF among senior tourists.

The three types of travel strain (TA, TF, and TTP) were found to positively affect seniors' STAB. This extends previous research on the relationship between unpleasant feelings from information technology and negative behaviors. Specifically, TA and TF were found to have positive effects on STAB, consistent with previous studies.

The results indicate the mediating effects of travel strains between smart tourism technostress and STAB, which extends the S - S - O theory to the smart tourism and senior tourism context. It provides more evidence for the connection between negative emotions, difficulties in using service technologies, and avoidance behaviors among seniors. Furthermore, the results confirm Rodríguez-Torrico et al.'s (2020) and Oh et al.'s (2021) conclusions that smart device literacy moderates the construction of smart tourism avoidance behavior.

5.Conclusion and implications

This study not only enriches the theoretical understanding of the S-S-O theory in the smart tourism domain but also has practical implications for smart tourism enterprises. By understanding the specific technostressors and travel strains related to senior tourists, these enterprises can better manage their resources and develop targeted marketing strategies. For example, if a smart tourism operator or destination knows that smart tourism techno-complexity (STTC) is a significant stressor for senior tourists, it can invest in user-friendly interfaces and training programs to help seniors overcome this complexity. Previous studies on technostress have largely overlooked the experiences of senior tourists. This study fills this gap by providing empirical evidence on the negative impacts of smart tourism technostress. It shows that the widespread use of smart tourism technologies can lead to travel anxiety, fatigue, and technophobia among seniors. This finding is significant as it highlights the need for a more inclusive approach to smart tourism development. The study's identification of smart tourism-related technostressors, travel strains, and avoidance behaviors provides a more comprehensive understanding of the psychological and behavioral aspects of older individuals in the context of smart tourism. This understanding can help researchers and practitioners develop more effective interventions to enhance the travel experiences of seniors. For example, knowing that travel technophobia (TTP) is a common strain among seniors, tourism service providers can offer personalized support and training to help seniors overcome their fears and embrace smart tourism technologies.

Practically, senior tourists need to be aware of the potential technostressors they may encounter when using smart tourism technologies. By acquiring effective stress-coping mechanisms, such as learning basic digital skills and seeking support when needed, seniors can transform hindrance stressors into positive experiences. For instance, many senior centers and community organizations now offer digital literacy courses specifically designed for older adults. These courses can help seniors build confidence in using smart devices and navigate the digital tourism landscape more easily. Collaboration between smart tourism operators and smart device developers is crucial to creating more user-friendly smart tourism technologies. By working together, they can design applications and tools that are tailored to the needs and capabilities of senior tourists. For example, a partnership between a major tourism operator and a smartphone manufacturer led to the development of a simplified travel app with large fonts, clear instructions, and one-touch access to essential services. The government has a role to play in alleviating smart tourism technostress among seniors. This can be done through measures such as providing technical support, facilitating digital literacy programs, and promoting a smart technology-friendly environment. For instance, implementing initiatives to provide free technology training for seniors and subsidize the purchase of smart devices (Schirmer et al., 2022).

6.Limitations and future research directions

The limitations of this study highlight areas for improvement and further research. The reliance on online surveys may have excluded seniors who are less tech-savvy or have limited access to the internet. Future studies could use a combination of research methods, including in-person interviews and focus groups, to reach a more diverse sample of senior tourists. Additionally, testing the research model only on Chinese seniors may limit the generalizability of the findings. Future research could expand the study to include seniors from different countries and cultures to explore whether there are cultural differences in the perception and experience of smart tourism technostress. Future research could also incorporate scenario experiments to simulate real-life situations and observe how seniors respond to different technostressors. This could provide valuable insights into the decision-making processes and coping strategies of senior tourists. Another area for future research is to consider the individual differences among seniors, such as their levels of digital literacy, physical abilities, and psychological characteristics. By understanding these differences, researchers can develop more targeted interventions and recommendations for different subgroups of senior tourists. Finally, longitudinal studies could track the changes in senior tourists' attitudes and behaviors towards smart tourism technologies over time, providing a more dynamic understanding of the impact of technostress.

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