

# Barriers to smart tourism for the elderly: a qualitative exploration of challenges and needs

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## Abstract

**Purpose** – As the global population continues to age, the smart tourism industry faces the challenge of effectively catering to older adults. However, current smart tourism systems are often designed for tech-savvy users, potentially excluding older adults from digitized travel experiences. Through in-depth interviews with 20 older adults in Vietnam, this study aims to explore the multidimensional barriers they encounter when interacting with smart tourism services. The findings reveal that these barriers are not just about technical skills but also include psychological issues like fear and overwhelm, as well as unaccommodating interface design. Despite this, older adults demonstrate agency by using adaptive strategies such as delegating tasks to family members or seeking in-person support from staff. This research advocates for an inclusive smart tourism model that incorporates age-friendly design, human-assisted support systems and capacity-building programs to empower seniors as active participants in the evolving tourism landscape.

**Keywords** Smart tourism, Older adults, Technology barriers, Digital inclusion, Vietnam

**Paper type** Research paper

## Introduction

As populations around the world continue to age, the tourism and hospitality industries are increasingly called upon to address the unique needs of older adults. According to the United Nations, by 2050, one in six people globally will be aged 65 or older (United Nations *et al.*, 2019). This demographic shift is not merely a social concern – it also represents a significant economic opportunity. The aging population constitutes a growing market segment with the time, resources and motivation to travel, particularly in the post-retirement phase. As noted by Balderas Cejudo (2024), the aging population represents a key economic segment for the tourism and hospitality industry, which needs to adapt to their changing needs and preferences.

In parallel, the tourism sector is undergoing a major transformation with the rise of smart tourism, which leverages digital technologies – such as mobile apps, artificial intelligence, the Internet of Things (IoT) and smart infrastructure – to enhance tourist experiences and optimize destination management (Gretzel *et al.*, 2015; Buhalis and Amaranggana, 2015). While smart tourism promises increased personalization, efficiency and real-time



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information, it is often developed with tech-savvy users in mind, potentially excluding less digitally literate populations such as older adults (Femenia-Serra *et al.*, 2022).

A growing body of research has examined the digital divide in tourism, but limited attention has been paid to the structural and perceptual barriers that prevent older adults from participating fully in smart tourism ecosystems. Older adults face multiple interrelated challenges when engaging with digital technologies, including physical limitations (e.g. vision, hearing, dexterity), cognitive decline, low confidence and unfamiliarity with rapidly changing interfaces (Krishnan *et al.*, 2020; Zaid *et al.*, 2023). As highlighted by Olphert *et al.* (2005), a fundamental lack of awareness and understanding of the digital world remains a major barrier to digital technology adoption among the elderly. In the tourism context, these challenges may be exacerbated by time-sensitive decision-making, language barriers and unaccommodating digital platforms (Gitlow, 2014).

Moreover, despite policy-level efforts to promote inclusive and accessible tourism, most smart tourism design frameworks remain inadequately attuned to the physical, cognitive and emotional needs of senior travelers (Xu *et al.*, 2023). This disconnect raises important equity concerns and calls for greater inclusion of elderly perspectives in both the design and evaluation of tourism technologies and services.

While some recent studies have explored elderly users' interaction with digital tools in tourism settings (Femenia-Serra *et al.*, 2022), there is a paucity of in-depth qualitative research that captures their lived experiences, frustrations and unmet needs in a digital-first tourism environment. Given the heterogeneity within the elderly population and the often-unseen nuances of digital exclusion, qualitative inquiry is essential to understand how older adults navigate, resist or adapt to smart tourism.

This study aims to fill this gap by exploring the barriers and challenges older adults face in engaging with smart tourism services. Using in-depth interviews with senior travelers, the research seeks to uncover:

- the technological, physical and psychological barriers they experience;
- their coping strategies or adaptations; and
- their perspectives on what an inclusive, age-friendly smart tourism model should look like.

By centering the voices of older adults, this study contributes to the emerging discourse on inclusive smart tourism and offers critical insights for designers, policymakers and tourism stakeholders seeking to make smart destinations truly accessible for all.

## Conceptual framework

### *The digital divide and older adults*

The concept of the digital divide highlights the structural disparities in access to, use of and familiarity with digital technologies across populations. Among older adults, this divide – often called the “grey digital divide” – is particularly pronounced, due to age-related declines in cognitive and physical abilities, low digital literacy and limited exposure to evolving technologies (Olphert *et al.*, 2005). These challenges often result in a sense of exclusion from increasingly digitalized services and environments, including tourism.

In the context of smart tourism, where travelers are expected to interact with mobile apps, smart devices and digital interfaces for navigation, booking and on-site experiences, the digital divide can become a critical barrier. Older travelers may lack the skills, confidence or physical ability to interact with such technologies efficiently (Lee *et al.*, 2021). This divide also intersects with socioeconomic factors and educational background, amplifying

inequality in access to tourism experiences (Wu and Yang, 2023). As such, the digital divide provides a structural lens for understanding how older adults are systematically disadvantaged in smart tourism contexts.

In addition to digital exclusion challenges, understanding the broader needs and motivations of senior tourists is essential to contextualize their experiences in smart tourism systems. Prior research highlights that elderly travelers are not a homogeneous group; their travel motivations and constraints are shaped by health, mobility, independence and psychological comfort (Zielińska-Szczepkowska, 2021). Evidence from remote European destinations shows that older tourists prioritize safety, clear information, personalized assistance and emotionally supportive environments, emphasizing that digital convenience alone cannot replace human-oriented service elements for seniors. This aligns with arguments that enhancing travel quality-of-life for elderly requires attention to emotional well-being, autonomy and perceived competence alongside physical accessibility (Zielińska-Szczepkowska, 2023). Integrating these insights underscores that inclusive smart tourism must go beyond technological provision to address emotional reassurance, confidence-building and service design tailored to diverse senior profiles – an aspect particularly relevant in rapidly digitalizing contexts like Vietnam.

#### *Technology acceptance model (TAM)*

To further explore individual-level experiences and attitudes, this study draws on the technology acceptance model (TAM). Originally proposed by Davis (1989), TAM suggests that two primary constructs – perceived usefulness (PU) and perceived ease of use (PEOU) – influence a user’s attitude toward adopting a technology, and subsequently, their behavioral intention to use it.

Recent studies have extended TAM in the context of elderly users by incorporating additional variables relevant to older adults, such as facilitating conditions (e.g. availability of help or training), compatibility (how well the technology fits with existing habits) and technology anxiety (Man et al., 2022). These adaptations are particularly relevant in tourism, where digital services may be unfamiliar or difficult to use without guidance or prior experience. TAM provides a useful lens to understand the cognitive and affective dimensions of older adults’ engagement with smart tourism platforms. For instance, if an elderly traveler perceives a tourism app as useful for finding information but difficult to navigate due to small fonts or unclear icons, their likelihood of adoption decreases, regardless of the app’s objective functionality. Furthermore, emotional comfort, prior digital experience and peer influence may play mediating roles.

This study combines the digital divide framework and an adapted version of TAM to examine barriers to smart tourism participation among older adults. The digital divide framework will be used to explore structural and social barriers, including access to technology, digital literacy and exclusionary design. TAM will guide the analysis of individual acceptance and rejection mechanisms by focusing on perceived usefulness, ease of use and contextual facilitators or constraints.

Through in-depth interviews with elderly travelers, this study aims to uncover how these two levels – structural and individual – interact to shape older adults’ experiences with smart tourism. This theoretical integration provides a more holistic understanding of why smart tourism may fail to be inclusive for this growing demographic group.

It is important to position this study critically within the existing literature. While prior gerontechnology research has extensively documented usability barriers, low digital confidence and the mediating role of social support (Krishnan et al., 2020; Harris et al., 2022), much of this work addresses general digital technology use rather than tourism-

specific contexts. Our study builds on this foundation but departs from it in two respects. First, it situates older adults' barriers within the distinctive pressures of smart tourism – an environment characterized by time-sensitivity, spatial unfamiliarity and high-stakes decisions – which amplify the general challenges documented in gerontechnology research. Second, rather than simply confirming that usability is important, the study moves toward identifying what forms of design and support are needed specifically for relational and mediated modes of tourism participation. In this sense, while prior studies emphasize individual usability, our findings suggest that usability alone is insufficient without accompanying emotional reassurance and relational support infrastructure. This positions the contribution as complementary to, and extending beyond, existing inclusive design and digital divide literature. Emerging work on age-friendly smart tourism (Xu *et al.*, 2023) and on co-creation in tourism technology design (Costa *et al.*, 2025) provides related reference points, but has not yet fully theorized the relational participation modes evidenced here.

### *Urban aging and digital adaptation in Vietnam*

Vietnam is undergoing one of the fastest urban aging transitions globally, creating profound implications for social participation and digital inclusion among older citizens. The demographic shift is pronounced: the aging index reached 49% for those aged 60+ and 33% for those aged 65+ as early as 2019 (Nguyễn, 2021). Urban areas face the most rapid change, with projections indicating that the proportion of individuals aged 65+ will rise from 7% in 2020 to 14% by 2035 and triple to approximately 21% by 2050 (Maheshwari and Maheshwari, 2024). These figures suggest not only a significant demographic transition but also escalating pressure on urban systems – including healthcare, mobility, public services and tourism – to adapt to aging populations.

Despite living in environments where digital transformation is advancing rapidly, many older adults in Vietnam struggle to integrate into the emerging digital society. While seniors increasingly recognize the benefits of digital tools, particularly for convenience, safety and improved access to services, they continue to encounter substantial barriers to adopting and using digital technologies effectively (Nguyen, 2023). Existing research points to limited technological awareness, low digital literacy and a lack of targeted guidance as key constraints. Sociodemographic factors – including education level, income and previous exposure to technology – have been identified as critical determinants of digital adaptation (Nguyen *et al.*, 2022).

These barriers manifest in several ways, such as a lack of confidence, unfamiliarity with digital platforms and a general absence of support systems tailored to the needs of older adults. As Nguyen (2023) note, many seniors are aware of the potential advantages of digital technology but feel ill-equipped to use it independently, often citing inadequate instruction and absence of assistance. This underscores the need for structured training, targeted government initiatives and intergenerational support mechanisms to enable more inclusive digital participation and foster active aging in Vietnam's rapidly digitalizing urban environment.

In the context of smart tourism, these existing structural and socio-cultural conditions shape how older Vietnamese travelers experience and navigate digital systems. The interaction between urban aging, digital readiness and tourism technology adoption suggests that barriers faced by older adults extend beyond individual capability – reflecting broader institutional, infrastructural and socio-cultural dynamics. Understanding this context is essential to situate elderly travelers' digital challenges not merely as personal limitations but as outcomes of intersecting demographic and technological transitions.

**Methodology***Research design*

This study adopts a qualitative research design grounded in an interpretivist paradigm, aiming to explore the lived experiences, perceptions and challenges of older adults engaging with smart tourism. Given the exploratory nature of the research and the need to capture nuanced understandings of barriers, a semi-structured interview approach was deemed most appropriate (Bryman, 2016).

*Sampling and participants*

Participants were selected using purposive and snowball sampling techniques to ensure relevance and diversity. The inclusion criteria required that participants (i) be aged 65 years or older, (ii) currently reside in major urban areas in Vietnam (representing the North, Central and South regions) and (iii) have traveled at least once in the past six months. This criterion was set to ensure participants had recent tourism experiences that potentially involved interactions with digital or smart technologies.

A total of 20 older adults (11 women and 9 men) participated in the study (see Table 1). The sample included retired professionals, small business owners and community elders, with varying degrees of digital literacy. The use of snowball sampling – initiated through the researcher’s existing networks – enabled access to participants who were both information-rich and diverse in experience.

*Data collection*

Data were collected through semi-structured interviews, allowing flexibility to probe participants’ experiences while maintaining consistency across key themes. The interviews explored topics such as digital tools used during travel, perceived difficulties, levels of digital confidence, experiences with digital booking platforms and preferences for assistance or

**Table 1.** Participant demographic characteristics

Participant ID	Gender	Age	Region	Education level	Recent travel frequency (past 6 months)
P01	Female	67	North	High school	2 trips
P02	Male	75	South	College	1 trip
P03	Female	70	Central	University	2 trips
P04	Male	69	North	University	1 trip
P05	Female	68	South	High school	2 trips
P06	Male	74	North	Secondary school	1 trip
P07	Female	80	North	College	1 trip
P08	Male	65	South	University	1 trip
P09	Female	71	Central	High school	1 trip
P10	Male	75	North	College	2 trips
P11	Female	66	South	Secondary school	1 trip
P12	Male	73	Central	High school	2 trips
P13	Female	67	North	University	2 trips
P14	Male	70	South	College	1 trip
P15	Female	72	Central	High school	2 trips
P16	Male	68	North	High school	1 trip
P17	Female	69	South	University	1 trip
P18	Male	65	South	High school	1 trip
P19	Female	74	North	College	1 trip
P20	Male	67	South	University	3 trips

design. Interviews were conducted in person or via video call, depending on participants' preferences and availability. Each interview lasted between 45 and 75 min and was audio-recorded with verbal consent. Field notes were taken to supplement the recordings and capture contextual observations.

### *Ethical considerations*

Although formal ethical approval was not sought from an institutional review board, the study followed widely accepted ethical standards in social research. Participants were informed of the study's purpose, their right to withdraw at any time and how their data would be used. Informed consent was obtained verbally before recording. All identifying information was anonymized to protect participants' privacy. The researcher made additional efforts to ensure respectful engagement, particularly given the participants' age and potential sensitivities.

### *Data analysis*

Data were transcribed *verbatim* and analyzed manually using an inductive thematic analysis approach (Braun and Clarke, 2006). The analysis followed a multi-stage coding process:

- Initial coding focused on identifying recurring patterns, expressions of difficulty, emotional reactions and references to digital tools.
- Axial coding was used to cluster codes into broader categories such as “confidence and control,” “technology fatigue,” “support needs” and “adaptive behaviors.”
- Theme development involved synthesizing the categories into explanatory themes that reflected common experiences and barriers.

Although AI-assisted tools were used for transcription support and organizing field notes, no generative AI or analytical software was used to interpret or categorize data. All analytical decisions were made by the researcher, preserving the interpretive integrity of the data.

To strengthen analytical rigor, coding consistency was ensured through iterative comparison and repeated revisiting of transcripts. The researcher maintained reflexivity throughout, acknowledging positionality within the Vietnamese context and its potential influence on interpretation. Thematic saturation was assessed inductively and reached after approximately 16–18 interviews, with the final two confirming existing patterns. While single-coder analysis is a limitation, the iterative, multi-stage coding process, combined with informal member-checking with two participants, supports analytical credibility (Braun and Clarke, 2006).

## **Findings**

### *Low digital confidence and skills*

Many participants expressed a lack of confidence in using digital tools related to tourism, such as booking apps, QR codes, e-tickets or using e-devices in the hotel. This lack of digital literacy often caused anxiety and avoidance:

I still ask my son to book things for me. I'm afraid I might click the wrong thing and lose money (P20).

Even when I travel, I write everything down instead of using those apps. I don't trust myself with them (P06).

“The hotel asked me to scan a QR code. I didn't even know how to open the scanner on my phone” (P15). While recounting this moment, P15 mimicked holding her phone and squinting at the screen, her finger moving slowly over imaginary icons. She sighed and said she eventually handed the phone to a younger guest in the lobby:

Although I stayed in a separate room during the trip, I had to call my nephew over multiple times—sometimes to help me connect to the Wi-Fi, sometimes to turn on the television or find the right channel. Even figuring out how to open the door or activate the electricity with the card was confusing for me (P05).

These experiences reflect both skill gaps and low perceived ease of use, aligning with barriers described in the TAM.

At Tan Son Nhat Airport, several older travelers stood in front of the self-check-in kiosks, holding printed itineraries while hesitating to touch the screen. One woman repeatedly adjusted her glasses and tried to enlarge the text by tapping the display, before stepping aside and signaling for an airline staff to assist. Another elderly man watched the younger passengers complete the task, then quietly moved to the traditional counter queue instead.

#### *Psychological barriers: Fear, overwhelm and technology fatigue*

Several participants described psychological resistance to engaging with smart systems due to feelings of fear, overwhelm or mental fatigue.

“Sometimes I get tired just looking at all those icons. I don’t know which one to touch” (P10). P10 rubbed his forehead as he spoke, describing how “too many buttons” gave him “a headache.” He paused mid-sentence, closed his eyes and made a gesture like swiping away notifications:

I feel scared to press anything. What if I make a mistake and ruin the whole plan? (P14).

Too many updates, too many changes. I gave up (P16).

Everything in the hotel was controlled by technology—even just moving between floors or entering the building required swiping a card. I kept forgetting the card, got confused, and felt exhausted trying to figure things out. I had to keep asking others for help, which made me feel like a burden (P19).

These statements suggest that even when access exists, emotional discomfort can limit adoption.

Interpreted more deeply, the psychological barriers described here are not simply evidence of low perceived ease of use as TAM would frame them. They reflect, more fundamentally, a perceived loss of control: the fear of making an irreversible mistake in an unfamiliar, time-pressured environment. This risk perception is amplified in tourism contexts, where errors carry real material consequences (lost money, missed transport, failed check-ins). The experience of technology fatigue – “I gave up” (P16) – represents not just cognitive overload but a form of learned withdrawal from environments that consistently provide negative feedback. This is distinct from general digital anxiety; it is a rational adaptive response to repeated experiences of failure or confusion with systems not designed for the user. Understanding these barriers as expressions of threatened autonomy and accumulated negative experience, rather than simply as usability problems, has direct implications for how interventions should be designed: emotional reassurance and confidence-building are as important as interface simplification.

#### *Lack of inclusive design and support systems*

Participants frequently mentioned that digital tools were not designed with their needs in mind. Inadequate font sizes, complex interfaces and limited customer support were recurring issues:

The font is too small. I always need my reading glasses and even then it’s hard (P07).

Some apps assume you already know how things work. There are no instructions (P13).

When I get stuck, there's no one to help me. I wish there was a hotline for older people (P18).

They should make a "simple mode" for us seniors. Too many functions just confuse me (P11).

These findings align with the concept of "facilitating conditions" in TAM and underline the importance of inclusive technology design.

#### *Adaptive strategies and reliance on social networks*

Despite facing significant technological and psychological barriers, many participants demonstrated remarkable adaptability through the use of interpersonal support networks, selective learning and delegation strategies. These adaptive practices played a key role in enabling continued travel and partial participation in smart tourism environments, even in the absence of full digital competence.

*Delegating digital tasks to family members.* A large number of participants reported delegating technology-related tasks – such as booking accommodations, navigating maps or checking in online – to younger family members. This delegation was not seen as a loss of independence but rather as a pragmatic workaround that allowed them to enjoy travel without the stress of managing digital tools:

I travel with my daughter. She handles all the tech stuff, and I just enjoy the trip (P02).

For all the online things, my nephew books it and then sends me the printout. I just bring it along (P12).

I don't even open apps when I travel. I let my grandson plan everything on his phone (P20).

These examples suggest that intergenerational support serves as a critical resource, substituting for gaps in digital skills and reducing stress for older travelers.

*Situational learning and "need-to-know" adaptation.* Some older adults reported that they only learned to use certain technologies when there was a clear, immediate need, and they were often selective about what they chose to adopt:

I didn't care about apps before. But once I got lost in Da Nang, I forced myself to learn Google Maps (P03).

I only know how to use Zalo and grab. That's enough for me when I travel (P17).

I asked my niece to show me how to scan QR codes. I can't remember everything, but I remember what I use (P12).

This goal-oriented learning approach reflects both limitations in cognitive bandwidth and a strategic focus on familiar, repetitive tasks. It also highlights that complete digital fluency may not be necessary if targeted skills are developed through repetition and relevance.

*Relying on in-person assistance.* For tasks that could not be handled by family members or pre-trip planning, participants reported turning to hotel staff, airport employees or tour guides for assistance. While this reliance may be seen as dependency, participants themselves described it as part of normal travel behavior:

At the airport, the staff helped me check in with the machine. They were very kind (P03).

I always ask the hotel receptionist to book my return car. They know I can't use the apps (P17).

Sometimes I show my phone to the young people around me and ask them to help. People are helpful (P02).

I usually travel on tours with friends who are around my age, but since none of us are good with technology, we often have to rely on the tour guide to help us with things like checking in online or using travel apps (P13).

At a regional bus terminal, many seniors avoided QR check-in kiosks and instead queued at staffed counters. One woman, unable to locate her e-ticket on her phone, eventually handed it to staff and asked for help, saying she was afraid of “pressing the wrong button.”

This strategy underscores the need for human support infrastructures within smart tourism systems, where self-service technology is dominant but not universally accessible.

*Emotional framing of dependence and autonomy.* Interestingly, many participants did not feel ashamed of asking for help. Rather than viewing digital reliance as a deficit, they often framed it in relational or community terms. This suggests a relational understanding of autonomy, where independence is not absolute but co-exists with accepted forms of interdependence:

It’s okay to ask. I helped my parents in the past, now it’s my children’s turn (P17).

My daughter says I’m too slow with phones, so she does it for me. I don’t mind, I’m on vacation! (P12).

People are too proud these days. I just ask if I don’t know. There’s no shame in that (P02).

These narratives challenge the common discourse of digital exclusion as purely negative and suggest that adaptive agency among older adults may include knowing when and how to ask for help.

This theme demonstrates that digital exclusion does not necessarily equate to tourism exclusion. While technological systems present barriers, older adults actively mobilize social capital, experiential learning and delegated practices to continue engaging in tourism. These findings invite a more nuanced view of smart tourism – one that accommodates multiple modes of access and values relational forms of participation.

Interpreted at a higher level of abstraction, these adaptive patterns reveal something important about the nature of agency among older adults in digitally demanding environments. Agency here is not expressed as mastery or independence, but as resourcefulness – the capacity to identify and mobilize available resources (family, staff, strangers, selective learning) to achieve desired outcomes (travel, exploration, enjoyment). This form of agency is often invisible to system designers, who tend to measure success in terms of individual task completion rates. A more adequate measure of smart tourism inclusion would ask not only “can this person complete the digital task?” but “can this person participate meaningfully in tourism?” – a question that admits a much wider range of pathways and support configurations.

#### *Imagining an age-friendly smart tourism model*

While most participants described the barriers and their personal coping mechanisms, some also offered constructive visions of how smart tourism systems could be more inclusive for older adults. These expectations were often framed around simplicity, clarity and a sense of being cared for. Several participants mentioned that they would feel more confident using digital systems if interfaces were “less crowded,” with “big letters and voice instructions” (P08, P16). A few suggested having “a special mode for older people” in tourism apps, which would avoid excessive notifications, offer slower navigation steps and feature human help when needed (P05, P11, P17).

Some also emphasized the importance of “real people available when the app doesn’t work”, expressing frustration with fully automated services and chatbots. As one participant

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put it: “I want a system that feels like someone is walking me through, not throwing me in the water” (P04). Another recurring request was for pre-trip tutorials or in-person help desks at destinations, where older travelers could be guided gently through digital procedures. These visions reflect a desire not only for technical usability but also for emotional reassurance and social inclusion. This theme highlights that older adults are not simply reacting to technology, but actively reimagining how it could better serve their needs, reinforcing the importance of involving them in design and evaluation processes.

## Discussion

This study has explored the challenges that older adults face in engaging with smart tourism, revealing that digital exclusion in this context stems from the intersection of structural, cognitive and emotional factors. While previous research has highlighted the general difficulties that older populations encounter with digital technologies (Krishnan *et al.*, 2020; Harris *et al.*, 2022), our findings bring these issues into sharp relief within the tourism domain, where time-sensitive, information-heavy and often unfamiliar digital environments pose unique demands.

Drawing on the concept of the digital divide, the study illustrates how technological systems and infrastructures are often not designed with older users in mind. Participants described how the lack of age-appropriate digital content, combined with inaccessible interface design – such as small text, rapid navigation and lack of tactile feedback – created persistent barriers to participation. These experiences reinforce the notion that digital exclusion is not merely about access or device ownership, but about the deeper misalignment between technological systems and the lived realities of older adults (Wu and Yang, 2023; Nguyen *et al.*, 2022). The findings echo earlier observations that digital participation among older adults depends heavily on the extent to which technologies accommodate age-related changes in cognition, perception and interaction (Gitlow, 2014).

At the individual level, our data resonate with the TAM, particularly in how low perceived ease of use (PEOU) undermines the potential benefits of perceived usefulness (PU). Several participants acknowledged the utility of certain tools, such as map-based applications or e-ticketing systems, but reported discontinuing use due to frustration, fatigue or fear of making mistakes. These reactions suggest that conventional models of technology adoption may require adjustment when applied to aging populations. Specifically, as Man *et al.* (2022) argue, factors such as facilitating conditions, personal satisfaction and perceived compatibility with lifestyle play a critical role in older users’ acceptance of digital platforms. Our study supports this expanded view of TAM by showing that even when digital systems are functionally beneficial, they may still be emotionally or cognitively taxing for older users.

Beyond confirming these theoretical frameworks, the study provides evidence of how older adults respond to digital exclusion – not simply as passive recipients of technology, but as adaptive agents. Participants used a range of coping strategies, including delegating tasks to younger companions, relying on human support at tourism service points or learning selectively through repeated trial and error. These responses reflect a form of relational autonomy: rather than insisting on total digital independence, many older adults value systems that blend technology with human assistance and social interdependence. This reframing challenges assumptions that digital proficiency must equate to full automation or individual mastery.

Three conceptual patterns emerging from this study warrant attention for their theoretical and practical value. First, relational autonomy refers not to dependence, but to the strategic mobilization of social relationships to remain an active tourism participant. Second,

delegated digital participation describes a mode of engagement in which older adults participate in tourism not by mastering digital tools themselves, but by coordinating others to act on their behalf – a strategy shaped by the time-sensitive, unfamiliar and high-stakes nature of tourism contexts. Third, selective digital adoption captures a goal-oriented approach in which individuals learn only those tools that serve clear and recurring purposes. Together, these patterns suggest that smart tourism inclusion is better understood not as individual digital competence, but as the facilitation of multiple pathways to participation – direct, mediated or relational.

It is also important to recognize what makes smart tourism uniquely challenging compared to other domains of technology use. Unlike general digital services, smart tourism confronts older adults with environments that are simultaneously unfamiliar (new destinations, unfamiliar systems), time-pressured (airport check-ins, real-time navigation) and high-stakes (financial transactions, travel documentation). These contextual amplifiers mean that the emotional burden associated with smart tourism – fear of error, overwhelm, cognitive fatigue – is not simply a reflection of low digital confidence in general, but is intensified by the particular demands of the travel environment. A person who manages a familiar payment app confidently at home may still freeze at an airport kiosk. This distinction is important for both theory and design: barriers are not only about individual capability, but about the fit between cognitive-emotional resources and situational demands. Prior research on older adults and technology use (e.g. [Krishnan et al., 2020](#); [Gitlow, 2014](#)) captures the general picture, but the tourism context adds a layer of urgency and unfamiliarity that existing frameworks do not fully account for.

Importantly, some participants went beyond describing challenges to articulate what they believe inclusive smart tourism should look like. Their suggestions – such as simplified user interfaces, “senior modes,” audio-visual guidance and the availability of real people to support digital processes – demonstrate a proactive and reflective engagement with technology design. These visions reinforce calls in the literature to move toward co-design approaches in smart tourism development, where older adults are involved not just as users but as co-creators of technological systems that affect their mobility and well-being ([Costa et al., 2025](#)).

Notably, these findings must be understood against the backdrop of Vietnam’s rapid urban aging and accelerated digital transition. Vietnam is among the fastest-aging societies in the world, with the proportion of those aged 65 and above projected to triple by 2050, especially concentrated in urban areas ([Nguyễn, 2021](#); [Maheshwari and Maheshwari, 2024](#)). While older adults increasingly recognize the benefits of digital technologies, many continue to face limited awareness, inadequate guidance and uneven access to digital learning opportunities ([Nguyen, 2023](#); [Nguyen et al., 2022](#)). This social context amplifies the emotional burden and cognitive stress associated with smart tourism systems observed in our findings. Rather than reflecting individual reluctance alone, the hesitation, fear of error and reliance on human support represent structural realities of transitioning into a digital society that has not yet fully adapted to the needs of aging citizens. Thus, digital exclusion in tourism is intertwined with broader challenges of digital aging in Vietnam, underscoring the need for age-inclusive design, structured digital support infrastructure and intergenerational assistance models to ensure meaningful participation of older adults in smart tourism environments.

The implications of these findings are multifaceted. From a practical perspective, it is clear that older adults remain enthusiastic about travel and open to digital tools, but are often underserved by systems that assume a uniform baseline of digital literacy and agility. Without adaptive interfaces and integrated human support, these travelers are forced into dependence or digital disengagement, which can limit both their autonomy and their

enjoyment. The policy implications are equally significant: governments and tourism agencies need to treat digital inclusion as a core element of age-friendly tourism, not a secondary consideration. Public investment in digital literacy, incentives for age-inclusive innovation and regulatory frameworks that require accessibility standards in tourism platforms are necessary to close the gap.

At the design level, the findings call for more than generically “simplified” interfaces. Specifically, three principles emerge from participants’ experiences. First, progressive disclosure design: rather than presenting all available functions simultaneously, interfaces should reveal information and options in layers, allowing users to navigate at their own pace and cognitive load. This directly addresses the overwhelm described by participants confronted with icon-dense screens. Second, low-error recovery pathways: older adults’ fear of making irreversible mistakes was a primary barrier; systems should therefore make errors easy to undo and confirm before executing high-stakes actions (e.g. payments, bookings). Third, embedded human fallback: rather than treating human assistance as an exception or failure mode, smart tourism systems should design human support as a standard, seamlessly accessible layer within digital flows – for example, a one-tap call to a service agent within any booking screen. These principles reflect a broader shift from designing for individual digital competence toward designing for relational use – acknowledging that many older adults will always prefer, or depend on, a combination of digital and interpersonal resources to complete tourism tasks.

The study also makes a theoretical contribution by demonstrating the value of combining the digital divide framework with an expanded TAM to explain both structural exclusion and individual adaptation. This dual-level approach provides a more holistic understanding of technology use in aging societies and can inform future interdisciplinary research across gerontology, tourism and digital design. Moreover, the study extends the Vietnamese literature on digital aging by offering a focused analysis of how these dynamics play out specifically in the tourism context – a sector that is both economically vital and rapidly transforming through smart technologies.

More specifically, the findings suggest several ways in which the standard TAM framework requires extension when applied to older adults in smart tourism. TAM assumes that perceived usefulness (PU) and perceived ease of use (PEOU) are the primary determinants of adoption, and that sufficiently high PU can offset lower PEOU. Our data challenge this assumption. Several participants clearly perceived digital tourism tools as useful – they recognized the convenience of apps, e-ticketing and digital navigation – yet they still did not use them independently. Fear, emotional overwhelm and cognitive fatigue functioned as barriers that PU alone could not overcome. This suggests that TAM, in its standard form, underrepresents the role of emotional burden in adoption decisions. Furthermore, the relational and delegatory patterns observed here – what we term relational autonomy and delegated digital participation – fall entirely outside TAM’s individual-level adoption logic. TAM does not account for the possibility that an individual may participate in a digital system through social mediation rather than direct use. Extending TAM to incorporate emotional burden (fear, fatigue, overwhelm), relational facilitation (family, staff, bystander support) and multi-pathway participation would produce a more descriptively adequate model for aging populations in high-stakes digital environments such as tourism. While prior work has already added variables such as technology anxiety, facilitating conditions and compatibility to TAM (Man *et al.*, 2022), the present findings point to the need for a more fundamental reconceptualization: not merely adding variables, but questioning the individualist assumption at the model’s core.

In sum, the findings suggest that smart tourism, as currently configured, is not inherently inclusive. Technological advancement alone does not guarantee equitable access. If the industry is to keep pace with the demographic shifts of an aging world, it must move toward models of smart tourism that are not only efficient but also empathetic – designed with, and for, the diversity of human experience across the life course.

### Conclusion and recommendations

This study has examined how older adults in urban Vietnam engage with smart tourism services, uncovering the range of barriers they face and the strategies they adopt to navigate increasingly digitized travel environments. Although many seniors express openness toward digital tools, their experiences reveal a persistent mismatch between technological systems and the cognitive, emotional and sensory realities of later life. Smart tourism, in its current form, often assumes a default user profile that excludes aging bodies, slower processing speeds and a need for emotional reassurance. As a result, older travelers are left to devise individual workarounds in environments that should have been inclusively designed from the outset.

The study calls into question the assumption that digital innovation naturally leads to inclusion. Instead, it argues that without intentional design choices, human support systems and meaningful participation of older adults in development processes, smart tourism may deepen existing inequalities. To shift toward genuinely inclusive models, stakeholders in both public and private sectors must recognize older adults not only as a growing market but also as contributors to technological design and policy.

Based on the findings, several key recommendations emerge which are as follows.

First, tourism technology developers should prioritize age-inclusive design. This includes simplified interfaces, larger fonts, customizable navigation speeds and multimodal support (e.g. visual, audio and tactile options). Rather than treating these features as accessibility add-ons, they should be embedded from the design stage as core components of user experience. More concretely, this means applying progressive disclosure principles (presenting only the most necessary functions at each step), building low-error-recovery pathways (easy undo functions and confirmation prompts before high-stakes actions) and ensuring that interfaces are designed for relational as well as individual use – for example, allowing a companion to co-navigate a booking flow alongside the traveler.

Second, human support must remain central in smart tourism systems. Automated services cannot replace the interpersonal dimension that many older travelers depend on, especially when facing unfamiliar environments or digital obstacles. Human-assisted alternatives – such as help desks, customer service staff trained in age-sensitive communication and hybrid online-offline options – should be systematically integrated.

Third, capacity-building initiatives are essential. Public and private stakeholders should collaborate to offer digital literacy programs tailored to older adults' needs and learning styles. Pre-trip workshops, interactive guides and peer-to-peer coaching could help build confidence while also reducing over-reliance on family members or travel companions.

Fourth, inclusive policymaking should align digital tourism strategies with broader frameworks on aging and social equity. Governments and city planners must ensure that smart city agendas do not marginalize older populations. This involves supporting research on aging and technology, incentivizing innovation in inclusive travel and embedding accountability mechanisms for accessibility in tourism services.

Finally, future research should continue to explore older adults' evolving relationships with technology in tourism. Longitudinal and participatory studies can deepen our understanding of how digital adaptation unfolds over time and under different social

conditions. More comparative studies across regions and cultural contexts are also needed to capture the diversity of aging experiences in tourism.

As the global tourism sector becomes increasingly digitized, it must also become more humane. Smart tourism will only fulfill its potential when it is designed not merely for efficiency, but for dignity, inclusion and accessibility across the life course.

### Limitations and future research

While this study offers valuable insights into the barriers experienced by older adults in smart tourism contexts, several considerations should be acknowledged. First, the sample was limited to urban-dwelling older adults in Vietnam who had traveled at least once in the previous six months. This criterion ensured the relevance of participants' experience with tourism, but it may have excluded more vulnerable populations – such as rural seniors, those with limited mobility or those digitally disconnected – whose experiences of exclusion may be even more pronounced. Rather than aiming for statistical generalizability, this study emphasizes contextual and experiential depth; however, future work could examine whether similar experiential patterns emerge in different demographic groups to enhance transferability.

Second, the study relied on self-reported narratives and retrospective accounts, which, while rich in subjective depth, may be affected by recall bias or social desirability. Although efforts were made to foster a comfortable and reflective interview environment, participants may have underreported feelings of anxiety or overestimated their adaptability in relation to digital technology use. To enhance credibility and capture digital interactions as they unfold, future research could incorporate ethnographic observations, digital diaries or *in situ* shadowing of senior travelers.

Third, the study was exploratory in nature and did not differentiate participants by specific socioeconomic indicators such as education level, income or digital exposure. These variables may play a significant role in shaping how older adults experience and respond to digital tourism systems. Future research may adopt stratified qualitative sampling or mixed-methods approaches to examine intra-group differences and offer more nuanced implications for inclusive smart-tourism design.

Looking ahead, research should not only identify barriers but also explore interventions. Promising directions include evaluating senior-friendly interface prototypes, co-designing tourism platforms with older adults and examining the effectiveness of intergenerational support or on-site human-assistance models. In addition, comparative studies across countries in Southeast Asia would help illuminate the interplay between cultural norms, infrastructural readiness and demographic change in shaping aging-smart tourism dynamics.

Finally, as artificial intelligence and personalization technologies continue to transform tourism experiences, scholars must critically examine how such innovations are being deployed and whether they exacerbate or alleviate age-based digital exclusion. Interdisciplinary efforts – linking gerontology, tourism studies, urban aging and human-computer interaction – are needed to ensure that technological innovation advances inclusivity, emotional comfort and equitable participation for older adults in digital tourism ecosystems.

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