

Understanding Vietnamese Tourists' Re-Browse Intentions for Smart Tourism Apps: An Extended TAM Approach

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Abstract: This study examines Vietnamese young tourists' perceptions of smart tourism applications, focusing on their influence on flow experiences and re-browse intentions. Using an extended Technology Acceptance Model (TAM), the research surveyed 455 respondents, analyzing how app dimensions—user interface design, informativeness, interactivity, personalization, and accessibility—affect perceived ease of use, usefulness, enjoyment, and security. The findings reveal that perceived enjoyment and security significantly enhance e-flow experiences, which in turn foster re-browse intentions. Practical implications include strategies for app developers to optimize design features and personalization to improve user engagement and loyalty.

Keywords: e-flow experience; re-browse intention; smart app dimensions; Vietnamese young tourists

1 INTRODUCTION

Thanks to the breakthrough development of mobile devices and information technologies, smart tourism is now in its era [1]. While various technologies enhance smart tourism, information and communication technologies (ICTs) are essential [2], and smart tourism technologies (SSTs) are indeed transforming tourist behaviors and providing exceptional tools for tourism providers to gain competitive advantages [3], [4]. Enhancing the tourist experience is challenging, but the achievement is worth it because a better tourist experience will result in favorable responses [3]. Regardless of previous results on SSTs, scholars believe that the findings could not be generalized because of differences among research contexts [5]. Therefore, Vietnamese tourists will be targeted in this study with the expectation that better understandings on how SSTs drive on tourists' e-experiences and their intentions will provide strategic design guidelines for practitioners operating in this market [4].

Vietnam's online travel ranks the top five in the Asia-Pacific area behind Indonesia, Thailand, and Singapore. VITA's 2023 figures indicated that the volume of individuals seeking tourist information online surged by nearly 32-fold compared to 2022. Statista (2023) [6] reports that 54 percent of Vietnamese respondents indicated they have utilized an online travel agency, and among online booking users in Vietnam, 40 percent reported traveling at least three times year. Furthermore, youthful travelers constitute the majority. This figure indicates both the segment's familiarity with e-commerce and its appeal to the hotel and tourist sectors [6]. Nguyen and colleagues (2021) [7] emphasize that younger demographics exhibit enthusiasm, interests, and a strong readiness to participate in travel activities. Vietnamese travel patterns have seen substantial changes over the past decade due to the digital revolution of the tourist sector. Nonetheless, research on smart tourism in Vietnam is inadequate, particularly at the individual level [8]. Nevertheless, research on smart tourism in Vietnam remains limited, particularly at the individual level, which constrains efforts to enhance

tourists' e-experiences and foster the development of behavioral intention [8].

Azis and colleagues (2020) [9] assert that current research on self-service technologies (SSTs) emphasizes on the reasons for tourists' use of SSTs and methods to promote this adoption, rather than elucidating the impact of SSTs on electronic experiences and fostering re-browsing intentions. For example, the role of various dimensions of SSTs, such as personalization and interactivity, in shaping young tourists' e-experiences and influencing their intentions to re-browse remains underexplored [10]. Moreover, digital specialists have noted that a substantial segment of the market has progressed beyond the introduction phase, and scholars advocate for research that considers post-behaviors in pursuit of more sustainable growth [10]. Additionally, e-experience is a novel concept that warrants thorough examination, as the dynamics of the virtual world differ significantly from those of the traditional world [11]. What constitutes an experience in real life is distinctly different from what defines an e-experience [11]. Consumer researchers believe that post-behaviors must be examined within a comprehensive model to emphasize the impact of STTs and e-experiences on specific behaviors [12]. This study aims to investigate the subsequent research questions:

RQ1: In what manner will the dimensions of STTs affect e-flow experiences?

RQ2: In what manner will the dimensions of STT affect re-browsing intention?

To address the aforementioned questions, this study will utilize a quantitative research design and implement a survey targeting Vietnamese e-tourists. A research model will be developed to hypothesize and assess the impact of features of smart tourism applications on users' e-flow experiences and their intention to re-browse. The anticipated findings aim to provide valuable insights for both scholars and practitioners within the context of Vietnam's tourism sector, offering guidance on how the functionalities of smart tourism apps can be optimized to enhance user experiences and facilitate re-browsing intention.

2 LITERATURE REVIEW

2.1 Theoretical Definitions

Smart tourism has emerged as a prominent concept in academic literature in the late 2020s, rapidly being adopted in practice due to its potential to enhance travel experiences and optimize operational and resource management [13]. Mehraliyev and colleagues (2020) [1] define smart tourism as a transformation in tourism management that involves the participation of all stakeholders within a cohesive ecosystem. While information and communication technology (ICT) is recognized as a pivotal element in the advancement of smart tourism, it is not the only factor, as technological innovations continue to evolve [14]. Cutting-edge technologies such as the Internet of Things (IoT), cloud computing, artificial intelligence (AI), augmented reality (AR), and virtual reality (VR), along with advanced devices and robust networks, are enhancing the attributes of tourism and driving it towards greater intelligence [4]. Furthermore, Gretzel and colleagues (2015) [15] categorize smart tourism into three components: smart destinations, smart business ecosystems, and smart experiences, all of which rely on data collection, analysis, and sharing.

2.1.1 Smart Tourism Technologies

Smart tourism technologies (STTs) mention all forms of smart tourism applications and tourism-related information sources such as online travel agents (OTAs), websites, personal blogs, social networking sites, and other smart tourism apps that continuously incorporate new functions as decision support systems, history records, VR/AR, facial recognition, and integrated payment methods, continuously adding and co-creating values for tourists, destination marketing organizations (DMOs), and tourism operators [3]. STTs in user-based platforms manifest six attributes, including: user interface design, accessibility, informativeness, interactivity, and personalization [13]. In this study, mobile apps will be examined as target forms of STTs.

User interface design refers to the finest visualization of a display that users can see [16]. The attribute manifests itself in an online platform as the general graphical presentation presented to the users, including design, structures, animation, layout, etc. [17]. In a basic level, interface design requires to be apparent, easy to look at, read, and find, while in a more advanced level, interface design requires to be professional, fashionable, artist, and eye-catching [18]. Users interact with smart tourism apps through front-ends, and their designs will probably more or less influence users' performing actions [19]. Based on empirical results, several design techniques have been applied to enhance the effectiveness of interface design, such as presentation optimization, semantic conversion, zooming functions, and focus and context tactics [20].

Informativeness refers to the extent of quality, credibility, and accuracy provided by an information source [21]. The attribute applied in a tourism-related platform demonstrates the volume of sufficient information satisfies users' needs about tourism [4, 22]. To save time and effort, users prefer using general apps to private ones because they

often contain more information, such as accommodations, tourist sites, foods, and restaurants, rather than about only one sector [5]. Keeping up with the development of mobile technology, smart tourism apps are sources of updated, frequent, and authentic information generated and shared by users as truly experienced tourists [13]. Information plays a crucial role for tourists in evaluating and making decisions, and thus it contributes to the quality of a smart tourism app [2].

Interactivity refers to the capability that allows multiple relationships among related stakeholders [21]. The attribute in a tourism platform will enhance the two-way communication of all involved parties [22]. For example, users can easily connect with other users sharing about tourism experiences, or users can connect with app operators in assisting with technical issues, or even users can work with hotel owners in booking their accommodations. Smart tourism apps are operating as social networks where all users can connect, share, and perform supported functions through their account registrations [4]. Interactivity encourages e-tourists to be actively involved and engaged in tourism behaviors [13].

Personalization refers to the degree to which individual attention is employed to a specific product or service [22]. The attribute expresses itself in a tourism platform as the ability to collect personal data and is able to offer suitable and appropriate recommendations [4]. For instance, based on provided information and behavioral preferences, the app may suggest fitting options, which in turn helps users save their time and effort in searching. Personalization is an enhanced function that is embedded in user platforms to increase flow experience and other users' action [9]. Personalization facilitates e-tourists to finalize their selections since they offer relevant information and offer 'best' alternatives' as users' demands [13].

Accessibility refers to the capability of having access to an information source [21]. The attribute applied in a tourism-related platform exhibits the ease that users can connect to [4, 22]. Often, many technologies will be implemented in an app since they will help enhance users' experience [1], and accessibility will also account for the quality of reachability of all STTs in that app. Users can get more information in the situation of high accessibility and will make decisions faster [5]. Accessibility plays as a facilitating condition for a smart app to be feasible to the e-tourists [13]. Accessibility is considered a prerequisite for other attributes to exert their influences on the user's intention [2].

2.1.2 Customer Perception

Perceived ease of use: Davis (1989) [23] initially characterized perceived ease of use as the extent to which an individual believes that utilizing a certain system would be effortless. In other words, perceived ease of use refers to the customer's perception about how difficult it is to use a system [24, 25]. Perceived ease of use is widely empirically supported as an antecedent explaining the adoption of new technology in customers [26-28]. In the context of smart tourism apps, perceived ease of use is the user's perception of the ease of performing functions on smart apps [24].

Perceived usefulness: Davis (1989) [23] defined perceived usefulness as the extent to which a person thinks that employing a certain system would efficiently enhance his/her job performance. In other words, perceived usefulness refers to the customer's perception about how much usefulness they gain when using a system [24, 29]. Perceived usefulness is empirically supported as a key factor in understanding why a person prefers to accept a new technology [26-28]. In the context of smart tourism apps, perceived usefulness is the user's perception of the utility of employing smart apps in their consumption behaviors related to tourism [24].

Perceived enjoyment: Davis (1992) [23] defined perceived enjoyment as the extent to which a person thinks that employing a certain system would be fun and enjoyable beyond its main functions. In other words, perceived enjoyment refers to the customer's perception about the pleasure they feel when using a system [30, 31]. Perceived enjoyment is empirically found as a factor in keeping a user accepting a new technology [28]. In the context of smart tourism apps, perceived enjoyment is the user's perception of the hedonism when employing smart apps in their search for tourism information [31].

Perceived security: No and Kim (2015) [22] defined perceived security as the extent of the overall safety of a specific system for all involved users. In other words, perceived security exhibits the degree to protect personal information and data circulating in the system [4, 32]. Security is the latest attribute required in developing and maintaining apps due to the cyber risks that appeared recently, and in turn, perceived security is increasingly required by online users toward current systems [33]. Security must be guaranteed in the context of smart platforms because they often involve multiple parties, and when risks occur, they are often spread with more intense influence [4]. In the context of smart tourism apps, perceived security is the user's perception of the safety when using the apps for their needs [13].

2.1.3 E-Flow Experience

E-experience is a key concept in understanding a user's behaviors in an online environment [34]. Flow experience is defined as a total sensation that one feels when they focus on a specific object with all involvement [35]. Flow experience is described as the merging of states that a person feels, such as awareness, attention, self-consciousness, and control [36]. Flow experience often occurs during network navigation searching, and that is when the concept of e-experience has emerged. When flow is experienced, nothing else seems to matter, and that keeps users in that environment [35, 37]. E-flow experience is a critical construct in the online environment and is considered an evaluative criterion for the success of an e-program. When users experience e-flow, they tend to spend more time and engage more deeply with the program [35]. Research has shown that e-flow experience is closely linked to expect virtual behaviors, such as e-satisfaction and e-loyalty, across various online platforms [34]. Liu and colleagues (2016) argue that e-flow experience should be examined within the context of e-commerce, as it is a key determinant of user engagement [37].

2.1.4 Re-Browsing Intention

Re-browsing intention is a behavioral concept in which it refers to the willingness to browse the searching from the same source [38]. Re-browsing intention is a reliable metric used to determine users' e-satisfaction because it shows they are satisfied with the browsing and thus likely to continue to browse for the next time [39]. Re-browsing intention is also considered a requirement in nurturing user loyalty because the repeated browsing is favorably associated with intense satisfaction. In the context of smart apps, re-browsing is highly valued as it contributes to both increased app traffic and improved business performance [40]. Re-browsing intention has garnered significant attention from app operators, as understanding the factors that drive this behavior can help identify strategic determinants to encourage returned users [41]. The stronger the intention to re-browse a smart app, the higher the probability that current customers will engage in desired behaviors such as making bookings or purchasing items [39].

2.2 Underlying Theory

The objective of this study is to navigate the re-browse intentions of users on smart tourism apps through app dimensions and users perceptions. Therefore, the TAM model has been adapted to establish the framework among factors [42]. The TAM is widely employed and validated to understand technological acceptance across information systems [43]. This study has employed the extended TAM to determine factors influencing the repurchase intention. Because the smart apps have already been adopted by young travelers and the information systems have been continuously upgraded, it is logical to utilize the extended TAM to propose hypotheses among external factors and intention behaviors [42]. Thus, smart app features will be hypothesized to influence users' perceptions, which will facilitate behavioral intentions

2.3 Research Hypotheses

2.3.1 The Relationship between Smart App Dimensions and Perceived Ease of Use

It is believed that app dimensions will significantly influence perceived ease of use toward that app, and this conclusion has also been empirically supported in various studies [5]. First, Azis and colleagues (2020) [9] highlight that the design of an app's dimensions will determine the user's satisfaction through the perception of ease in using. The result is explained by the reason that the app should be designed in a way that the target user can use it easily and find effortless in performing its functions [5]. Verkijika and De Wet (2019) [44] point out that users get frustrated with a system that they find difficult to use, and that will drive user dissatisfaction. Second, informativeness is believed to have a positive influence on perceived ease of use, as the sufficiency and quality of relevant information enhance the ease of using the smart app [47]. Third, interactivity is expected to increase perceived ease of use, as users can engage with app supporters and other users, facilitating their interaction with the app [49]. Fourth, personalization is proposed to improve

perceived ease of use, as greater customization for target users tends to make the app feel easier to use [50]. Finally, accessibility is thought to contribute to the perception of ease of use, as users who can easily access a smart app are more likely to find it effortless to perform the app's functions [51]. While few studies have examined the impact of smart app dimensions on perceived ease of use, previous empirical research has established a positive relationship between app attributes—such as user interface design [45, 46], informativeness [47, 48], interactivity [49], personalization [50], and accessibility [51]—and perceived ease of use. Thus, the study proposes:

- H1-a: User interface design positively influence on perceived ease of use.
- H1-b: Informativeness positively influence on perceived ease of use.
- H1-c: Interactivity positively influence on perceived ease of use.
- H1-d: Personalization positively influence on perceived ease of use.
- H1-e: Accessibility positively influence on perceived ease of use.

2.3.2 The Relationship between Smart App Dimensions and Perceived Usefulness

Findings have reported that app dimensions will prominently influence perceived usefulness toward that app, and they are explained by the fact that app dimensions are designed in a way that helps users perform app functions [5]. To achieve the most optimal perceived usefulness, app operators should consider the familiarity and skillfulness of the target user to design the app [50]. Baker-Eveleth and Stone (2020) [52] have argued that any failure in app design would more or less drive down the perceived usefulness in target users because the users perform app functions through its dimensions. First, interface design enables users to navigate app functions quickly and efficiently, thereby enhancing their perception of the app's usefulness [46]. Second, informativeness provides users with the necessary information while using smart apps, which in turn increases their assessment of the app's utility [53]. Third, interactivity facilitates communication among users, thereby supporting their use of the app [54]. Fourth, a higher level of personalization ensures that the app's functionalities align with users' specific needs, thereby increasing perceived usefulness. Finally, accessibility is believed to strengthen perceived usefulness, as easy access to the app allows users to fully utilize its features, leading them to perceive it as more useful [56]. Previous empirical studies have found the positive relationship between app dimensions and perceived usefulness across research contexts: user interface design [46], informativeness [53], interactivity [54, 55], personalization [50], and accessibility [56]. Thus, the study proposes that:

- H2-a: User interface design positively influence on perceived usefulness.
- H2-b: Informativeness positively influence on perceived usefulness.
- H2-c: Interactivity positively influence on perceived usefulness.

- H2-d: Personalization positively influence on perceived usefulness.
- H2-e: Accessibility positively influence on perceived usefulness.

2.3.3 The Relationship between Smart App Dimensions and Perceived Enjoyment

Findings have pointed out that the dimensions of smart app could influence the users' perceived enjoyment, and these relationships have been extensively enhanced in the context of a virtual environment to increase the adoption level [57]. For interface design, both scholars and practitioners agree that the design of a smart app can significantly influence the perceived fun and happiness users experience while interacting with it [58]. For instance, app designers suggest that a carefully chosen color scheme can positively impact users' moods [58]. Regarding informativeness, the availability of relevant information can enhance users' perceived enjoyment, particularly when it aligns with their hedonic values. For example, the inclusion of entertaining content might increase users' enjoyment [58]. In terms of interactivity, it is believed that users experience greater happiness when they can engage with others. For example, app operators suggest that features such as chat functions can boost users' happiness by allowing them to share information and experiences [59]. Concerning personalization, customization ensures that the app aligns with users' preferences, thereby enhancing their enjoyment [60]. For instance, offering users access to their favorite topics can make them feel more cheerful. Finally, with regard to accessibility, users are more likely to experience delight when the app is easily accessible, as it allows them to quickly obtain what they need without delays [61]. Previous studies have found results on the positive relationship among each dimension of smart app dimensions on perceived enjoyment across virtual applications, such as user interface design, informativeness [58], interactivity [59], personalization [60], and accessibility [61]. Thus, the study proposes that:

- H3-a: User interface design positively influence on perceived enjoyment.
- H3-b: Informativeness positively influence on perceived enjoyment.
- H3-c: Interactivity positively influence on perceived enjoyment.
- H3-d: Personalization positively influence on perceived enjoyment.
- H3-e: Accessibility positively influence on perceived enjoyment.

2.3.4 The Relationship between Smart App Dimensions and Perceived Security

Scholars highlight that smart app dimensions will also positively contribute to the perceived security toward that app [62]. Perceived security is getting the users' attention and becoming a requirement of users employing any online system [63]. Turner-McGrievy and colleagues (2017) [64] demonstrate that the design of an app will help users trust its safety. Since perceived security is considered an evaluation of risk-free, an app should be operated in a way that users are

not concerned about employing it [65]. In terms of informativeness, app operators believe that high-quality and up-to-date information strengthens the perception of security, as users associate these attributes with official management and authoritative oversight [68]. Regarding interactivity, users are more likely to feel trust when an app allows communication with others, as it reassures them that they have companions with whom they can share risks [69]. In terms of personalization, apps can be tailored to meet the security preferences of target users [70]. For example, younger users may require more advanced safety features, while older users may prefer simpler, more reassuring security modes [9]. Concerning accessibility, users are more likely to feel secure in an app when they can easily access it [71]. In practice, users have been shown to be skeptical if they are unable to access an app on the first try, often leading them to forgo subsequent attempts to access the app [5]. Previous studies have found the favorable link between app dimensions and perceived usefulness in various online function systems: user interface design [66, 67], informativeness [68], interactivity [69], personalization [70], and accessibility [71]. Thus, the study proposes that:

- H4-a: User interface design positively influence on perceived security.
- H4-b: Accessibility positively influence on perceived security.
- H4-c: Informativeness positively influence on perceived security.
- H4-d: Interactivity positively influence on perceived security.
- H4-e: Personalization positively influence on perceived security.

2.3.5 The Relationship between Perceived Ease of Use, E-Flow Experience, and Re-Browsing Intention

Lu and colleagues (2022) [72] have found that perceived ease of use positively contributes to the flow experience since the ease of using a system would keep the experience flow continuously. Users will be interrupted if they find difficulty in using an app, and it will unfavorably drive down the flow experience. Ashraf, Thongpapanl, and Spyropoulou (2016) [73] argue that flow experience is crucial in enhancing other related behaviors such as visiting intention, positive word-of-mouth, or destination loyalty [74, 75]. Previous studies have supported the positive relationship between perceived ease of use and e-flow experience as well as repurchase intention across app settings [72, 75-77]. Thus, this study proposes:

- H5-a: Perceived ease of use positively influence on e-flow experience.
- H5-b: Perceived ease of use positively influence on re-browsing intention.

2.3.6 The Relationship between Perceived Usefulness E-Flow Experience, and Re-Browsing Intention

Kong and Wang (2021) [78] highlight the positive association between perceived usefulness and flow experience in their study on visual programming. Scholars support the relationship by explaining that users have deeper flow experience in an app when they find the system useful

and help them perform tasks better and more effectively [79], [80]. App operators are advised to enhance the extent of usefulness that a target user perceives in enhancing the e-flow that the user experiences [72]. In addition, scholars recommend that perceived usefulness will result in post-behavioral intentions as the fact that users will continuous use apps that they evaluate useful [74]. Previous empirical studies have found the favorable relationship between perceived usefulness and flow experience as well as repurchase intention [75, 78, 81]. Thus, this study proposes:

- H6-a: Perceived usefulness positively influence on e-flow experience.
- H6-b: Perceived usefulness positively influence on re-browsing intention.

2.3.7 The Relationship between Perceived Enjoyment E-Flow Experience, and Re-Browsing Intention

Zhao and Khan (2022) [82] found that perceived enjoyment was positively associated with flow experience among students in using online English learning platforms. It is explained by the reality that when users feel enjoyable, they will be addicted and tend to spend more time [83]. Leung (2016) [84] suggested that mobile applications should be designed in a way that can create happiness for users while using them so that it will increase the adoption level as well as revisit intention. Previous empirical studies have supported the similar pattern across online systems [85-87]. Thus, this study proposes that:

- H7-a: Perceived enjoyment positively influence on e-flow experience.
- H7-b: Perceived enjoyment positively influence on re-browsing intention.

2.3.8 The Relationship between Perceived Security E-Flow Experience, and Re-Browsing Intention

Since 2005, Wu and Chang (2005) [88] recognized the role of perceived security to flow experience through the influence of trust toward an information system. From then, various authors have found the direct relationship between perceived security and flow experience as well as repurchase intention as the increasing awareness of cyber risks along with the popularity of mobile applications [65, 89, 90]. The link is explained by the fact that online users perceive security as a requirement to guarantee their safety when working in virtual environments [65]. Chen and colleagues (2017) [91] indicated that a higher perception of risks would reduce the flow experience as well as international tourist satisfaction toward revisiting Myanmar. Thus, this study proposes that:

- H8-a: Perceived security positively influence on e-flow experience.
- H8-b: Perceived security positively influence on re-browsing intention.

2.3.9 The Relationship between Perceived Enjoyment E-Flow Experience, and Re-Browsing Intention

Chen and colleagues (2017) [91] highlight the vitality of flow experience and repurchase intention in their study

among international tourists toward Myanmar. Flow experience is an overall sensation that one feels with total involvement, and when it works, it will increase people's favorable responses toward the system that creates that flow [92]. In an online game context, intense e-flow experience will lead to addiction and continuous playing [93]. Previous authors believe that the positive association between e-flow experience and re-browsing intention is similar across other virtual platforms and has been supported through empirical studies [91, 92, 94]. Thus, this study proposes that:

- H9: E-Flow experience positively influence on browsing intention.

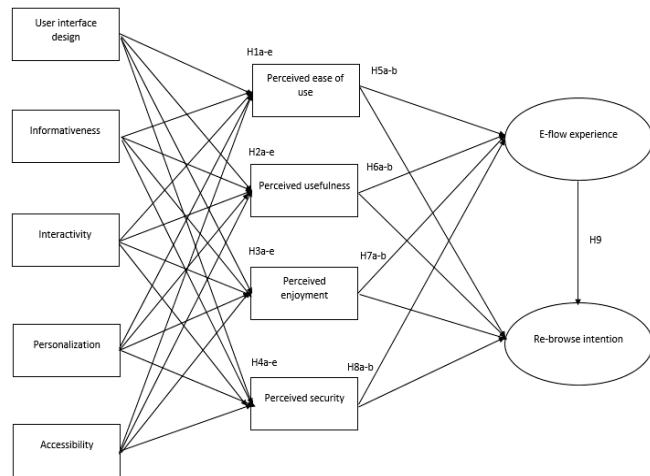


Figure 1 The research model

3 RESEARCH METHODOLOGY

3.1 Research Design

The research objectives are to identify and determine the influence of smart app dimensions on customers' perceptions and their behaviors in terms of e-flow experience and re-browsing intention toward that app, so quantitative research

methodology has been employed. Research hypotheses have been developed after an extensive literature review and an adapted research model. Quantitative data has been collected and analyzed to test research hypotheses. Discussions and implications will be generated through quantitative results.

3.2 Research Method

3.2.1 Data Collection

A survey has been conducted to collect quantitative data. Target participants are young tourists (age from 16-34) who have used smart apps for their tourism searching, planning, and purchasing. Some smart tourism apps are named for participants' references: Online Travel Agents (e.g., Traveloka, Booking.com, Mytour, etc.) or destination websites (e.g., Vietnamtourism, etc.). Participants are approached through social media (Facebook, Zalo, e-mail) by online questionnaires.

The questionnaire is designed with two filtered questions and two main sections. The filtered questions are required participants to answer, including: (1) Have you ever used any smart tourism apps on mobile devices before? and (2) Please kindly name smart tourism apps that you have used. Only valid answers will be accepted for further analysis. The two main sections are: (1) evaluative items and (2) demographic information. The first section includes factors in the research model, and they have been adapted from previous reflective measurement scales. Independent factors include: (1) user interface design adapted from Sonderegger and Sauer (2010) [18]; (2) informativeness, interactivity, personalization, and accessibility adapted from [22]. Dependent factors include (1) perceived ease of use adapted from [25]; (2) perceived usefulness adapted from [29]; (3) perceived enjoyment adapted from [30]; (4) perceived security adapted from [32]; (5) e-flow experience adapted from [37]; and (6) re-browsing intention adapted from [38]. The second section includes demographic information for descriptive statistics such as gender, age, marital status, income, and occupation.

Table 1 Constructs measurement items

Constructs	Items	Authors
User interface design (DE)	The design is visually engaging.	Sonderegger and Sauer (2010) [18]
	The design is aesthetically pleasing.	
	The design has a intuitive interface.	
	The design is easy to use.	
Informativeness (IF)	During my travels, tourism apps offer valuable information about my travel destinations	No and Kim (2015) [22]
	During my travels, tourism apps are helpful for assessing both the destination(s) and the overall trip.	
	During my travels, tourism apps enable me to complete my trip with the detailed information provided.	
	During my travels, tourism apps allow me to successfully complete my trip by providing detailed and essential information.	
Interactivity (RAC)	During my travels, I can access a wide range of questions and answers from other travelers on tourism apps.	No and Kim (2015) [22]
	During my travels, the tourism apps I use are highly responsive to my needs.	
	During my travels, the tourism apps I use are highly interactive.	
	During my travels, sharing tourism-related content on apps is easy and straightforward.	
Personalization (PER)	During my travels, tourism apps provide me with personalized information tailored to my needs.	No and Kim (2015) [22]
	During my travels, tourism apps offer clear and easy-to-follow paths and links.	
	During my travels, I can interact with tourism apps to receive personalized information.	
	During my travels, the tourism information provided by the apps effectively meets my needs.	
Accessibility (ACC)	During my travels, I can use tourism apps anytime and anywhere.	No and Kim (2015) [22]
	During my travels, I can easily use tourism apps.	
	During my travels, I can easily find tourism apps.	
	During my travels, I can search without a complicated sign-up process at tourism apps.	

Table 1 Constructs measurement items (continuation)

Constructs	Items	Authors
Perceived ease of use (PE)	Learning to use the smart tourism app would be very easy.	Van der Heijden (2004) [25]
	I find it easy to use the smart tourism app.	
	It is easy to become skillful in using the smart tourism app.	
Perceived usefulness (PU)	Using the smart tourism app increases my learning/life/social interaction performance.	Yang (2017) [25]
	Smart tourism app is useful for learning/life/social networking.	
	Using the smart tourism app enhances my effectiveness in learning/life/social networking.	
	Using the smart tourism app provides me with information that would lead to better learning/life/social networking.	
Perceived enjoyment (PJ)	I have fun interacting with the smart tourism app.	Kim, Chan, and Gupta (2007) [30]
	Using the smart tourism app provides me with a lot of enjoyment.	
	I enjoy using the smart tourism app.	
	Using the smart tourism app does not bores me.	
Perceived security (PS)	This smart app is a secure site through which to send sensitive information.	Salisbury and colleagues (2001) [32]
	I would feel totally safe providing sensitive information about myself through this app.	
	Overall, this app is a safe place to transmit sensitive information.	
E-flow experience (FL)	It is fun to use smartphone.	Liu and colleagues (2016) [37]
	Using smartphone is interesting.	
	When using smartphone, I feel the excitement of exploring.	
	I am absorbed when using smartphone.	
Re-browsing intention (RI)	I am going to re-browse smart tourism app in next trip as well.	Ajjan and Hartshorne (2008) [38]
	I think I will re-browse smart tourism app in the next trip as well.	
	I plan to re-browse smart tourism app in the next trip as well.	

The questionnaire is first developed in English and back-translated to Vietnamese to ensure compatibility between two versions of the language. A pilot test is conducted with a sample of 15 participants to minimize any errors or misunderstandings that might occur. Convenience sampling will be employed to reach an optimal number of target participants within the constraints of time and available resources. While this sampling method is subject to various biases, it is considered suitable for achieving the study's objectives [95]. The limitations of the study will be acknowledged, with suggestions provided for future research.

3.2.2 Data Analysis

Descriptive statistics will be analyzed for demographic information. Before the research hypotheses have been qualified, constructs will be tested in terms of reliability and validity, and model fit will be ensured. Reliability in terms of internal consistency (>0.8) and composite (>0.7) will be checked, while validity in terms of convergent ($AVE > 0.5$) and discriminant ($MSV > MS_A$) will be checked by SPSS and AMOS.

Model fit will be ensured and followed as suggested by [95]. Research hypotheses are supported at a p-value lower than 0.05.

4 DATA ANALYSIS AND RESULTS

4.1 Descriptive Statistics

Over five months, 518 questionnaires were collected but only 455 were qualified to continue for further analysis. Among the 455 participants, 41.1% were female. The age groups of 16-19 and 20-24 collectively comprised 68.1% of the sample. Additionally, 86.2% of participants reported an income of less than 20 million VND. Tab. 2 provides the profile of the sample.

Table 2 E-tourist respondent profiles

Respondent characteristics	No. of respondents	%
Gender		
Male	268	58.9
Female	187	41.1
Age		
16-19	112	24.6
20-24	198	43.5
25-29	86	18.9
30-34	59	13.0
Income		
< 10 million VND	176	38.7
10 – 20 million VND	216	47.5
> 20 million VND	63	13.8
Marital status		
Single	288	63.3
Married	167	36.7

4.2 Construct Measurement

Before the research model has been tested, constructs were examined to ensure their reliability and validity. In terms of reliability, internal consistency and composite reliability were conducted through Cronbach's alpha and CR. The results indicated that all constructs pass the threshold of internal consistency (Cronbach's alpha > 0.7) and composite reliability ($CR > 0.6$). Then, constructs were examined for their validity in terms of convergence and discriminant. Tab. 3 provides the validity of constructs.

The results indicated that all constructs were qualified with the threshold of convergent validity ($AVE > 0.5$) and discriminant validity ($MSV < AVE$). In addition, the model fit was ensured: (1) $C_{min}/df = 3.537$; (2) $CFI = 0.949$; (3) $PCFI = 0.829$; (4) $RMSEA = 0.075$. After the construct measurement, the structural equation modeling was analyzed to test the research hypotheses.

4.3 Structural Equation Modelling

The research of the model fit was also qualified: (1) $C_{min}/df = 3.606$; (2) $CFI = 0.947$; (3) $PCFI = 0.847$; (4)

$RMSEA = 0.076$. Tab. 4 provides the standardized regression weight of each research hypotheses.

The results pointed out that smart app dimensions are determined by users' evaluations toward those app functions. Specially, user interface design and informativeness positively influence perceived ease of use ($\beta = 0.486$ and $\beta = 0.162$, $p < 0.05$), supporting for H1-a and H1-b. User interface design, informativeness, personalization, and accessibility positive facilitate perceived usefulness ($\beta =$

0.13 , $\beta = 0.105$, $\beta = 0.304$, and $\beta = 0.126$, $p < 0.05$), supporting for H2-a, H2-b, H2-d, and H2-e.

Interactivity and personalization positively manipulates perceived enjoyment ($\beta = 0.481$, and $\beta = 0.109$, $p < 0.05$), supporting for H3-c and H3-d. Personalization and accessibility are found to positively affect perceived security ($\beta = 0.248$ and $\beta = 0.194$, $p < 0.05$), supporting for H4-d and H4-e.

Table 3 The constructs validity

	<i>AVE</i>	<i>MSV</i>	<i>ASV</i>	<i>Rla</i>	<i>DEa</i>	<i>IFa</i>	<i>RACa</i>	<i>PERa</i>	<i>ACCa</i>	<i>PEa</i>	<i>PUa</i>	<i>PJa</i>	<i>PSa</i>	<i>FLa</i>
<i>Rla</i>	0.927	0.403	0.128	0.963										
<i>DEa</i>	0.827	0.213	0.058	0.170	0.910									
<i>IFa</i>	0.942	0.205	0.046	0.189	0.042	0.971								
<i>RACa</i>	0.942	0.272	0.072	0.364	0.098	0.099	0.971							
<i>PERa</i>	0.940	0.205	0.113	0.405	0.281	0.453	0.347	0.970						
<i>ACCa</i>	0.979	0.124	0.034	0.063	0.352	0.051	0.154	0.177	0.989					
<i>PEa</i>	0.973	0.213	0.036	0.149	0.462	0.153	-0.018	0.136	0.130	0.986				
<i>PUa</i>	0.932	0.201	0.100	0.448	0.271	0.262	0.231	0.439	0.244	0.153	0.965			
<i>PJa</i>	0.899	0.272	0.107	0.466	0.068	0.163	0.522	0.299	0.094	0.011	0.385	0.948		
<i>PSa</i>	0.974	0.077	0.043	0.265	0.183	0.105	0.084	0.277	0.250	0.169	0.190	0.208	0.987	
<i>FLa</i>	0.841	0.403	0.123	0.635	0.103	0.279	0.302	0.396	0.082	0.118	0.384	0.511	0.250	0.917

Table 4 The path analysis

Hypotheses	Relationship	Path coefficient	p-value	Conclusion
H1-a	DE → PE	0.486	***	Supported
H1-b	IF → PE	0.162	***	Supported
H1-c	RAC → PE	-0.061	0.179	Unsupported
H1-d	PER → PE	-0.047	0.372	Unsupported
H1-e	ACC → PE	-0.032	0.482	Unsupported
H2-a	DE → PU	0.13	0.005	Supported
H2-b	IF → PU	0.105	0.026	Supported
H2-c	RAC → PU	0.086	0.054	Unsupported
H2-d	PER → PU	0.304	***	Supported
H2-e	ACC → PU	0.126	0.005	Supported
H3-a	DE → PJ	-0.012	0.797	Unsupported
H3-b	IF → PJ	0.069	0.134	Unsupported
H3-c	RAC → PJ	0.481	***	Supported
H3-d	PER → PJ	0.109	0.033	Supported
H3-e	ACC → PJ	0.000	0.996	Unsupported
H4-a	DE → PS	0.052	0.302	Unsupported
H4-b	IF → PS	-0.015	0.765	Unsupported
H4-c	RAC → PS	-0.034	0.484	Unsupported
H4-d	PER → PS	0.248	***	Supported
H4-e	ACC → PS	0.194	***	Supported
H5-a	PE → FL	0.064	0.125	Unsupported
H5-b	PE → RI	0.052	0.158	Unsupported
H6-a	PU → FL	0.203	***	Supported
H6-b	PU → RI	0.202	***	Supported
H7-a	PJ → FL	0.423	***	Supported
H7-b	PJ → RI	0.145	***	Supported
H8-a	PS → FL	0.122	0.004	Supported
H8-b	PS → RI	0.077	0.038	Supported
H9	FL → RI	0.464	***	Supported

The results indicated the relationship between user evaluation of a specific smart app and flow experience on users' intention to re-browse it. Perceived usefulness, perceived enjoyment and perceived security are supported to significantly drive on both e-flow experience and re-browse behavior. Perceived usefulness poses its influences on e-flow experience at $\beta = 0.203$ ($p < 0.05$), supporting for H6-a, and $\beta = 0.202$ ($p < 0.05$), supporting for H6-b. On the other hand, perceived enjoyment positively associates with e-flow

experience at a stronger level ($\beta = 0.423$, $p < 0.05$), supporting for H7-a than with re-browse intention ($\beta = 0.145$, $p < 0.05$), supporting for H7-b. Additionally, perceived security favorably influence on both e-flow experience and re-browse intention but at smaller levels ($\beta = 0.122$, and $\beta = 0.077$, $p < 0.05$, respectively), supporting for H8-a and H8-b.

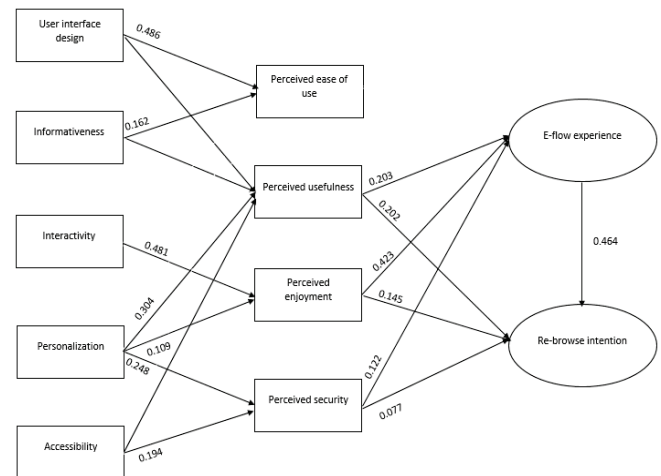


Figure 2 Structural model testing results

Finally, the results prove the positive link between e-flow experience and re-browse intention ($\beta = 0.464$, $p < 0.05$), supporting for H9. It is supported that perceived usefulness, perceived enjoyment, perceived security and flow experience play mediating roles in bridging the influence of smart app features and user re-browse intention.

The results do not support a statistically significant relationship between: (1) interactivity, personalization, accessibility, and perceived ease of use; (2) interactivity and perceived usefulness; (3) user interface design, informativeness, accessibility, and perceived enjoyment; (4) user interface design, informativeness, interactivity, and perceived security; and (5) perceived ease of use, e-flow experience, and re-browsing intention.

The results reveal discrepancies when compared to the proposed hypotheses. None of the dimensions significantly influence users' perceptions of ease of use, usefulness, enjoyment, or security, and none of the users' perceptions facilitate e-flow experience or re-browsing intention. First, perceived ease of use is not affected by interactivity, personalization, or accessibility, which was different with [49], [50], and [51]. This suggests that Vietnamese users do not find a smart tourism app easier to use simply because they can communicate with others or access the app quickly. Additionally, high customization of an app does not improve users' evaluations of ease of use. Second, perceived usefulness is not influenced by interactivity, meaning that the ability to interact with others within the app does not enhance its perceived usefulness, and was dissimilar with [54], and [55]. Third, perceived enjoyment is not driven by user interface design, informativeness, or accessibility, and was unlike with [58], and [61]. This indicates that Vietnamese users do not experience greater enjoyment simply because the app is well-designed, informative, or easily accessible. Fourth, perceived security is not determined by user interface design, informativeness, or interactivity, meaning that users' trust is not increased when the design is more polished, the information is more qualified, or the app allows for communication with other users. The findings were different with [67], [68], and [69]. Moreover, this study finds no support for a positive relationship between perceived ease of use and both e-flow experience and re-browsing intention. This results was contrast with Vahdat and colleagues (2021) [99] Chen and colleagues (2023) [100] when perceived ease of use was the strongest determinant of users' behaviors. It suggests that users' e-flow experiences are not enhanced, nor are their intentions to re-browse facilitated, by simply perceiving the app as easy to use, and the results were divergent with the study of [75]. Fig. 2 provides the result of path analysis.

5 DISCUSSIONS AND IMPLICATIONS

5.1 Theoretical and Methodological Implications

There are several theoretical implications drawn from this study. First, the study provides empirical validity for the TAM model in the context of smart tourism apps among Vietnamese. The adaptation of the TAM helps develop a research model that illuminates the relationships among smart app features in terms of (1) user interface design, (2) informativeness, (3) accessibility, (4) interactivity, and (5) personalization and users perceptions in terms of (1) perceived ease of use, (2) perceived usefulness, (3) perceived enjoyment, and (4) perceived security and e-flow experience and re-browse intention. As the TAM model provides a conceptual framework to determine external variables that contribute to perceived ease of use and perceived usefulness, which will later facilitate users behaviors, the study indicates that smart app dimensions, together with perceived enjoyment and perceived security, play as external variables in the TAM model, while e-flow experience and re-browse intention play as behavioral intention in the model [96], [97], [98], [100]. The study provides statistical results supporting the extension of the TAM model by incorporating SST dimensions and customer perceptions as determinants of

customer behavior [98, 100]. Additionally, the findings emphasize e-flow experience in predicting the re-browsing intention of young Vietnamese tourists toward a smart tourism app. Minimal previous studies have recognized the role of e-flow experience in understanding users' behaviors in virtual environments.

Second, this study provides an explanation of how the SST dimensions of a smart tourism app influence users' perceptions of ease of use, usefulness, enjoyment, and security. The statistical results find that perceived ease of use is directly influenced by user interface design and informativeness, and informativeness poses a more significant impact. The findings are compatible with the study of [19] supporting that interface design contributes to users perceived ease of use. This study reveals that perceived enjoyment is directly driven by interactivity and personalization, while perceived security is both driven by personalization and accessibility. The findings reflect the same pattern with [59]. In addition, the study also demonstrates that perceived usefulness is facilitated by user interface design, informativeness, personalization and accessibility. The results align with the study by [46], offering valuable insights for practitioners on how tourism apps should be designed to enhance user evaluations. Furthermore, it contributes to the literature on SSTs by conceptualizing them as a multi-dimensional construct consisting of five dimensions.

Third, e-flow experience is positively sharpened by perceived usefulness, perceived enjoyment and perceived security. The findings are similar to the study in the same research context [78, 87, 99]. Since hedonism is regarded as the core value of a smart tourism app, perceived usefulness and enjoyment are found to be key factors driving users' experience. Furthermore, in the context of virtual environment, perceived security is required as it assures the personal safety. Finally, the study specifies that re-browse intention is manipulated by perceived usefulness, perceived enjoyment, perceived security and e-flow experience. It is highlighted the role of users evaluation of a smart tourism app in terms of its usefulness, enjoyment, and security because they will both enhance users e-flow experience and encourage users' re-browse intention [100]. Unlike previous studies in this vein, the study focuses on identifying the antecedents of re-browse intention rather than browsing intention. This is significant because the era of mobile applications is already determined by the development phase, whereas most users are familiar with smart apps. Thus, it is logical for scholars to continuously spend effort on post-behavioral intentions for more intense and long-term strategies. Furthermore, this also helps explain why in this study, perceived ease-of-use does not pose significantly impact on users' experience as well as re-browse intention.

Methodically, the study employs quantitative research, and it is considered an appropriate research design to achieve its study's objectives. Quantitative data is collected through a survey with structurally designed questionnaires and is statistically analyzed by SPSS and AMOS to qualify construct measurements and research hypotheses. The conclusions are drawn by statistical results at p -value < 0.05 . All statistical results are confirmed with threshold values suggested by prominent scholars. The results are in line with

prior studies and reflect the theoretical relationship among proposed constructs.

5.2 Managerial Implications

There are several managerial implications highlighted from these study findings. For the first implication, it is once again affirmed the important role of a smart app design since its features play a significant foundation for enhancing users' e-flow experience and re-browse intention. Because five dimensions of a smart tourism app are identified as determinants of users perceived ease of use, usefulness, enjoyment, and security, smart app operators and digital managers in Vietnam tourism are recommended to prioritize the quality of their smart app dimensions in terms of interface design, informativeness, interactivity, personalization, and accessibility. However, these features should be designed and prioritized based on users' preferences, as the findings indicate that users' process and experience based on smart app dimensions. With respect to the results, the study recommends some strategic designs for a smart tourism app to be highly experienced by users in the context of Vietnam e-tourism commerce channels.

First, operators should simplify app design and enrich provided information because they will increase users' perceived ease of use and usefulness. More importantly, informativeness plays a stronger impact as the explanation that the fundamental intention of a smart tourism app is to provide related tourism information and the quality of the information will definitely add value to the app performance. Thus, tourism experts have elucidated that online users prefer to find information in a single source rather than multiple ones, and thus an app should offer diversified related information. The poor information will deteriorate users' processing and experiencing, which later will dim the re-browse intention.

Secondly, a smart app will be perceived as enjoyable if it offers a high level of interactivity as well as personalization among Vietnamese users. Interactivity allows users to interact with other parties, such as other users, app operators, or customer services. The two-way communication helps an app to be more enjoyable because users can exchange information and share what they have actually experienced. Since the core value of a tour is hedonism, and in turn, the interactivity is one way users can share that happiness with others. Subsequently, app operators nowadays consider interactivity a must-have feature rather than an optional one as before. Direct and open communication between tourism providers and users, as well as other users, may boost trust in online business transactions in the e-commerce process. Personalization also improves the perception of enjoyment since the customization of a smart app ensures the fitting with users. The high level of personalization in terms of contents and images will enhance the perceived enjoyment among users.

Thirdly, the study indicated that personalization and accessibility enhanced users' perceived security toward a smart tourism app. Unlike other previous studies, personalization is often negatively associated with perceived security as the reality that the higher degree of customization requires more revealed personal information. However, the

study found the difference when personalization is favorably associated with users' perceived security. It reflects the fact that the newly designed app is even customized but still guarantees users' personal information. Regardless of tailored information provided for each individual, personalization is to enhance the user's experience but not to be used for other purposes. Fourthly, accessibility is another dimension that also increases the users' perceptions of security. It is suggested that app operators improve the accessibility because the low accessibility will cause users suspicious and prevent them from continuing to sign up due to security concerns.

For the second implication, the study accentuates the important role of users' perceptions in deciding their behaviors directly and indirectly through e-flow experience. Perceived usefulness, perceived enjoyment, and perceived security remain critical factors in promoting e-flow experience and researching intention toward a smart tourism app among Vietnamese users. The study recommends app operators should focus on increasing users perceptions of usefulness, enjoyment and security as ways to improve e-flow experience and encourage re-browsing intention. For strengthening perceived usefulness and enjoyment, this study also identifies app operators who put effort into personalization and interactivity dimensions when designing app features because two dimensions pose the most significant influences.

For the third implication, digital managers should prioritize e-flow experience in measuring online channels since it reflects the total involvement of users experience when browsing and it will facilitate future behavioral intentions. Previous studies have demonstrated that e-flow experience will result in engaged behaviors such as citizenship behaviors, loyalty, and addiction, and in this study, re-browsing intention is found to be driven by e-flow experience. Re-browsing intention is an expected behavior that app operators put effort into promoting since it not only exhibits users' satisfaction with prior browsing but also brings on promising benefits. Experts show that smart apps have already passed the adoption level among young users, and subsequently academics are required to focus more on rebrowsing post-adoption behaviors. This study recommends that in order to improve the users experience and encourage future behavior, tourism providers should implement smart tourism technologies, as the results state that users perceptions are influenced by smart app dimensions, and the findings also highlight that users perceptions will enhance e-flow experience and facilitate re-browsing intention.

5.3 Limitations and Future Research Directions

Regardless of implications drawing from empirical findings, this study has also suffered from several limitations. The first limitation lies in the research model. Employing the extended TAM model, the study only considered smart app features, perceived enjoyment, and perceived security as external variables, while there were various other factors. In the same vein, research was determined at behavioral intention while others were excluded. Further studies can continue to take into consideration other factors that have not been researched in this study to provide a more

comprehensive picture about the relationships among related factors in this field. For example, exploring the relationship between e-flow experience, e-satisfaction, and e-word of mouth could provide valuable insights for developing more strategic app designs. The second limitation lies in the sampling method. This study employed the convenience sampling method to collect data. This non-probability method has its limitations. Future studies should improve the quality of data by employing methods that help reduce the weaknesses caused by this method. The last limitation lies in the sample. Although demographic information was collected, this study did not take into account the variance among demographic criteria. Future studies should consider the differences among online users because it is believed that digital behaviors are widely segmented. Future studies can compare the similarities and dissimilarities among groups to better highlight their behaviors in a virtual environment. For example, urban tourists may perceive the app differently from tourists in other regions of the country, or female tourists may experience e-flow differently than male tourists, leading to variations in re-browsing intentions.

6 CONCLUSION

This study demonstrates the significant impact of smart app dimensions, particularly personalization and interactivity, on young Vietnamese tourists' perceptions and re-browse intentions. By applying an extended TAM framework, the research highlights the importance of perceived enjoyment and security in fostering e-flow experiences. These findings offer valuable insights for app developers aiming to enhance user engagement and loyalty. Future research should explore diverse demographic groups, integrate additional app dimensions, and assess long-term behavioral outcomes to further validate and extend these findings.

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