



Continuance Intention to Use Mobile Tourism Apps: The Role of Usability Confirmation, Perceived Usefulness, and Satisfaction

Intenção de uso continuado de aplicações móveis de turismo: o papel da confirmação da usabilidade, da utilidade percebida e da satisfação

Van-Huy LE 

University of Economics, The University of Danang, Department of Marketing, Vietnam, levanhuy@due.edu.vn

Thi Thu Dung TRAN 

University of Economics, The University of Danang, Department of Business Administration, Vietnam, tranthudung92@gmail.com

Tan Thu Hien NGUYEN 

Birmingham City University, Birmingham City Business School, Department of Management, Business and Marketing, United Kingdom, hien.nguyen@bcu.ac.uk

Ethan VO

Nguyen Tat Thanh University, Faculty of Tourism, Vietnam, ethanvonttu@gmail.com

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Abstract

Drawing on the expectation–confirmation model and the mobile app usability–continuance intention fit model, a research model was proposed to explore travellers' continuance intention to use mobile tourism apps (MTAs). Two studies were conducted using an explanatory sequential mixed-method design (a two-phase survey combined with interviews). Quantitative findings from 478 Vietnamese travellers indicated that most dimensions of MTA usability confirmation are positively related to perceived usefulness and satisfaction, which, in turn, positively influence continuance intention to use. App dependability was found to have the strongest effect on perceived usefulness, whereas app design had the greatest influence on satisfaction. The qualitative findings further explain why travellers value reliable information, functional convenience, personalised recommendations, and stable app performance when using MTAs. This study's originality lies in combining the concepts of "confirmation" and "mobile app usability" to develop a new concept, "confirmation of MTAs usability," which enables us to better explain the belief-affect-intention process for using an MTA at the post-usage stage.

Keywords: mobile tourism apps; continuance intention; usability confirmation; expectation–confirmation model; perceived usefulness; traveller satisfaction.

Resumo

Com base no modelo de confirmação de expectativas e no modelo de ajustamento entre usabilidade de aplicações móveis e intenção de continuidade de uso, foi proposto um modelo de investigação para explorar a intenção dos viajantes de continuarem a utilizar apps de turismo. Foram realizados dois estudos, recorrendo a um desenho metodológico misto sequencial explicativo, combinando um inquérito em duas fases com entrevistas. Os resultados quantitativos, obtidos junto de 478 viajantes vietnamitas, indicaram que a maioria das dimensões da confirmação da usabilidade das apps de turismo está positivamente relacionada com a utilidade percebida e a satisfação, as quais, por sua vez, influenciam positivamente a intenção de continuidade de uso. A fiabilidade da aplicação revelou o efeito mais forte sobre a utilidade percebida, enquanto o design da aplicação teve a maior influência sobre a satisfação. Os resultados qualitativos explicam ainda por que razão os viajantes valorizam informação fiável, conveniência funcional, recomendações personalizadas e desempenho estável quando utilizam estas aplicações. A originalidade reside na combinação dos conceitos de "confirmação" e "usabilidade de apps", desenvolvendo o novo conceito de "confirmação da usabilidade das aplicações móveis de turismo", que permite explicar melhor o processo crença-afeto-intenção no uso destas aplicações na fase pós-utilização.

Palavras-chave: aplicações móveis de turismo; intenção de continuidade de uso; confirmação da usabilidade; modelo de confirmação de expectativas; utilidade percebida; satisfação dos viajantes.

1. Introduction

Mobile tourism apps (MTAs), defined as end-user software applications, are designed for mobile devices and specifically targeted at travellers. From a business perspective, MTAs are valuable tools for reaching potential customers, conveying information, and triggering travellers' needs (Liang et al., 2017; Saghier et al., 2026). On the travellers' side, the digitalisation of the tourism sector (e.g., MTAs) enables them to search for information, find accommodations, transportation, flights, and events, and make bookings at any time (Alonso Gallo et al., 2024; Liu et al., 2023; Rodrigues et al., 2024; Wei et al., 2023). Overall, digitalisation helps enhance the supply and demand for tourism products and services (Alonso Gallo et al., 2024). Furthermore, the restrictions imposed as a result of unexpected events (e.g., COVID-19) had dramatic impacts on the tourism industry (Ngo & Duong, 2024; Pattanayak et al., 2022; Tsai et al., 2023; Vo-Thanh et al., 2022), which has placed smart technologies at the core of solutions for combating these unexpected events (Leung et al., 2022; Tsai et al., 2023). However, only half of the MTAs are kept on mobile devices after the trip (Linton & Kwortnik, 2015), due to the specific nature of tourism consumption.



Most studies on MTAs have focused on adoption (Kirova & Vo-Thanh, 2019; Tsai et al., 2023), leaving a scarcity of research on post-adoption behavioural intention, which is important for app developers, tourism businesses, and policymakers (Chiu et al., 2021; Wei et al., 2023). Reviews consistently indicate that research on post-adoption and continuation intentions for both mobile and tourism apps remains underexplored (Tan, 2025). Recent studies on continuance intention have essentially mobilised the belief-affect-intention process. Confirmation, perceived usefulness, and mobile app usability are the key elements of the "belief" (cognitive) component (Bhattacharjee, 2001; Hoehle & Venkatesh, 2015; Wei et al., 2023), while satisfaction makes up the "affect" component (Akdim et al., 2022), and continuance intention refers to the "intention" component (Bhattacharjee, 2001; Hoehle & Venkatesh, 2015). However, this belief-affect-intention process has not been fully explored. Indeed, "confirmation" (Bhattacharjee, 2001) has been conceptualized as an aggregate construct and lacks sufficient insights into the constituent dimensions (Bhattacharjee & Premkumar, 2004) while the construct should be decomposed into specific dimensions to provide detailed guidelines for the design of an information system (IS) (e.g., an MTA) and better explain how users may continue to use it (Islam et al., 2017). Thus, the "belief" component needs further development.

Existing studies have mainly focused on either adoption-related factors or general continuance intention models. Limited studies have integrated confirmation and mobile app usability dimensions in the tourism app context to explore how post-usage evaluations shape travellers' continuance intention. Moreover, prior studies treated confirmation as a general construct, offering limited insight into which specific usability dimensions influence travellers' perceptions and satisfaction. Therefore, this study differs from previous research by integrating ECM and MAUCIF to develop the concept of MTA usability confirmation and by examining its multidimensional effects on perceived usefulness, satisfaction, and continuance intention.

This study addresses this gap by investigating continuance intention to use an MTA using the belief-affect-intention process. We developed a unique research model that combines the expectation–confirmation model (ECM) and the model of mobile app usability–continuance intention fit (MAUCIF) and tested it with 478 Vietnamese travellers. This combination enabled us to extend scholarship on behavioural intention at the post-adoption stage. We enrich the "belief" component by combining two concepts – "confirmation" and "mobile app usability" to make up a new concept of "confirmation of MTA usability" that can, then, be used in the information systems and tourism literature. Given the importance of MTAs for smart destinations and their significant role in enhancing touristic experiences, perceived destination image, and behavioural intention (Ercan, 2023; Kirova & Vo-Thanh, 2019; Soliman et al., 2021; Sustacha et al., 2023), we offer important practical implications for MTA developers, tourism providers, and policymakers.

An explanatory sequential mixed-method design was employed, combining a two-phase survey with semi-structured interviews. The quantitative findings revealed that most dimensions of MTA usability confirmation positively influence perceived usefulness and satisfaction, which subsequently shape continuance intention to use. The qualitative findings further explained why travellers particularly value app dependability, information quality, convenience, and personalised recommendations in tourism contexts.

2. Literature review

2.1 Confirmation and expectation–confirmation model

The ECM was developed based on the expectation–confirmation theory (ECT) in consumer behaviour. However, the ECT has only considered users' expectations before using an IS, ignoring the role of users' experience. Thus, Bhattacharjee (2001) developed the ECM to explain the continuance intention to use an IS.

The ECM explains the three-stage process in user behaviour, namely belief, affect, and intention, which initiates continuance intention to use an IS. First, after using an IS, users assess its usefulness, which is regarded as the most crucial post-adoption factor affecting users' satisfaction with the IS usage (Chiu et al., 2021). Second, perceived usefulness and confirmation from previous experiences affect users' satisfaction. Third, satisfied users may continue to use that IS, and conversely, unsatisfied ones may stop using it.

However, in the ECM, the confirmation construct has been conceptualised as an aggregate construct and offers insufficient insight into its constituent dimensions (Bhattacharjee & Premkumar, 2004). Confirmation is defined as the congruence between expectations about an IS and its actual performance (Bhattacharjee, 2001). Later, Gong et al. (2020) extended the ECM to the context of mobile services by combining the confirmation construct with the value concept, including social, hedonic, and utilitarian value. The confirmation construct should be decomposed into specific dimensions to provide detailed guidelines for the design of an IS and to explain better how users may continue to use it (Gong et al., 2020) and how it is considered in different contexts (Islam et al., 2017). Thus, the present study seeks to shed light on this issue by combining confirmation with app usability concept in the context of MTAs.



2.2 App usability and app usability–continuance intention fit

App usability refers to the extent to which a user can use an app efficiently in a specific context (Hoehle & Venkatesh, 2015). Studies have demonstrated that app usability positively influences continuance intention to use (Hoehle & Venkatesh, 2015; Tan et al., 2020). Nevertheless, current research models on app usability remain inconsistent and have not led to specific improvements and developments in app design and interface (Tan et al., 2020).

What is lacking is that studies have conceptualised app usability without integrating important contextual factors (Johnson et al., 2020). For example, mobile apps often have specific characteristics, such as portability or screen-size limitations, that are often overlooked (Weichbroth, 2020). Thus, existing models may not fully explain mobile app usability. According to recent studies, contextual reliability and usability have been identified as key factors influencing continuance intention in mobile service environments (Situmorang et al., 2025).

Hoehle and Venkatesh (2015) developed the model of mobile app usability–continuance intention fit (MAUCIF), which includes dimensions of app usability and can assist in developing mobile apps. The MAUCIF is used to predict continuance intention to use and mobile app loyalty. The MAUCIF is one of the first models explaining the relationship between various dimensions of mobile app usability and continuance intention to use. Considering context-specific factors, Hoehle and Venkatesh (2015) provided a comprehensive conceptualisation of app usability that can be employed to design successful apps and serve as a foundation for future research to capture the impact of app usability on continuance intention to use. Later, Tan et al. (2020) recognised the relevance of MAUCIF in improving the effectiveness of mobile apps.

By combining MAUCIF with ECM, this study investigates the effect of confirming MTA usability on travellers' continuance intention to use. According to Tan et al. (2020), MAUCIF has thus far been applied only to the social media mobile app context. Scholars have suggested that further investigation on usability and continuance intention in other contexts and types of application is needed (Hoehle & Venkatesh, 2015). The advent of mobile apps has significantly influenced tourism, serving as tools for communication and assistance during touristic consumption (Kirova & Vo-Thanh, 2019). Therefore, research aimed at improving MTA usability to ensure it meets travellers' needs and triggers their continuance intention to use is of great importance.

While tourism consumption differs from that in most apps, it is highly experiential, temporary, and uncertainty-sensitive. Travellers often depend on MTAs in situations involving mobility, time pressure, and real-time decision-making. Thus, the tourism context may reshape continuance-intention processes because travellers evaluate app usability through both technical performance and the app's ability to reduce uncertainty during travel.

2.3 Perceived usefulness, satisfaction, and continuance intention to use

Bhattacharjee (2001) describes perceived usefulness as one of the main determinants of technology adoption that can influence continuance intention to use. In the IS field, satisfaction refers to positive user feedback regarding the attributes or quality of an IS's content or services (Chea & Luo, 2008; Huy et al., 2019). Previous studies have investigated the relationships among confirmation, perceived usefulness, and satisfaction (Tam et al., 2020) or among perceived usefulness, satisfaction, and continuance intention (Bhattacharjee, 2001; Wei et al., 2023). However, no research has explored the relationships among these variables within an integrative model, thereby paving the way for this study.

3. Research model

The research model was built based on ECM and MAUCIF, which enabled us to propose the concept of "*confirmation of MTA usability*" from two separate concepts, namely "confirmation" and "mobile app usability", accordingly, expanding the understanding of the belief-affect-intention process in using mobile apps at the post-usage stage in the tourism context.

Research demonstrated a positive influence of confirmation on users' perceived usefulness of apps (Liu et al., 2023). In addition to the six dimensions of the MAUCIF, Tan et al. (2020) added a seventh—app dependability. App dependability has been identified as an important dimension that positively influences continuance intention to use mobile apps (Tan et al., 2020). Based on prior theoretical and empirical work, we argue that confirmation of MTA usability may be positively related to travellers' perceived usefulness of MTAs. Therefore:

H1a,b,c,d,e,f,g: The confirmation of (a) app design; (b) app utility; (c) interface graphics; (d) interface structure; (e) interface input; (f) interface output; and (g) app dependability is positively associated with travellers' perceived usefulness.

Confirmation is obtained when users perceive that their expectations of the app align with its actual performance during use (Bhattacharjee, 2001). Research on tourism apps has demonstrated that confirmation positively affects travellers' satisfaction (Liu et al., 2023). However, research on the effect of confirmation of MTA usability on satisfaction remains unexplored. Thus:



H2a,b,c,d,e,f,g: The confirmation of (a) app design; (b) app utility; (c) interface graphics; (d) interface structure; (e) interface input; (f) interface output; and (g) app dependability is positively associated with travellers' satisfaction with MTA usage.

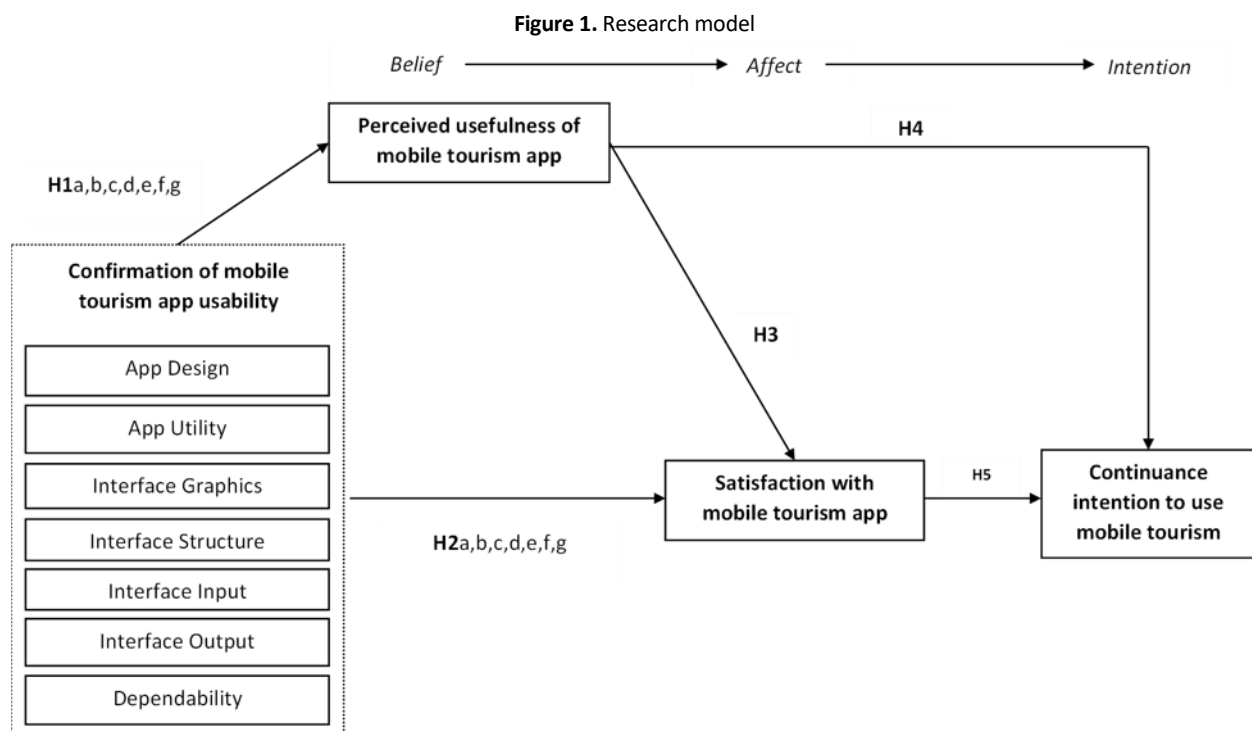
Previous studies on mobile apps have shown that perceived usefulness significantly influences users' satisfaction with mobile app use (Liu et al., 2023). Perceived usefulness represents a cognitive belief important to IS use (Davis et al., 1989). Perceived usefulness is an evaluation that can be appreciated before, during, and after consumption (Vo-Thanh et al., 2021). Moreover, perceived usefulness positively influences continuance intention to use (Liu et al., 2023). Thus:

Travellers' perceived usefulness of an MTA is positively associated with their satisfaction with MTA use (H3) and their continuance intention to use an MTA (H4).

Some studies on mobile apps have revealed a positive influence of users' satisfaction on their continuance intention to use (Liu et al., 2023). However, research on this relationship in the context of MTAs remains scarce, enabling the following hypothesis:

H5: Travellers' satisfaction with MTA usage is positively associated with continuance intention to use an MTA.

Figure 1 summarises our research model.



Source: authors' own elaboration.

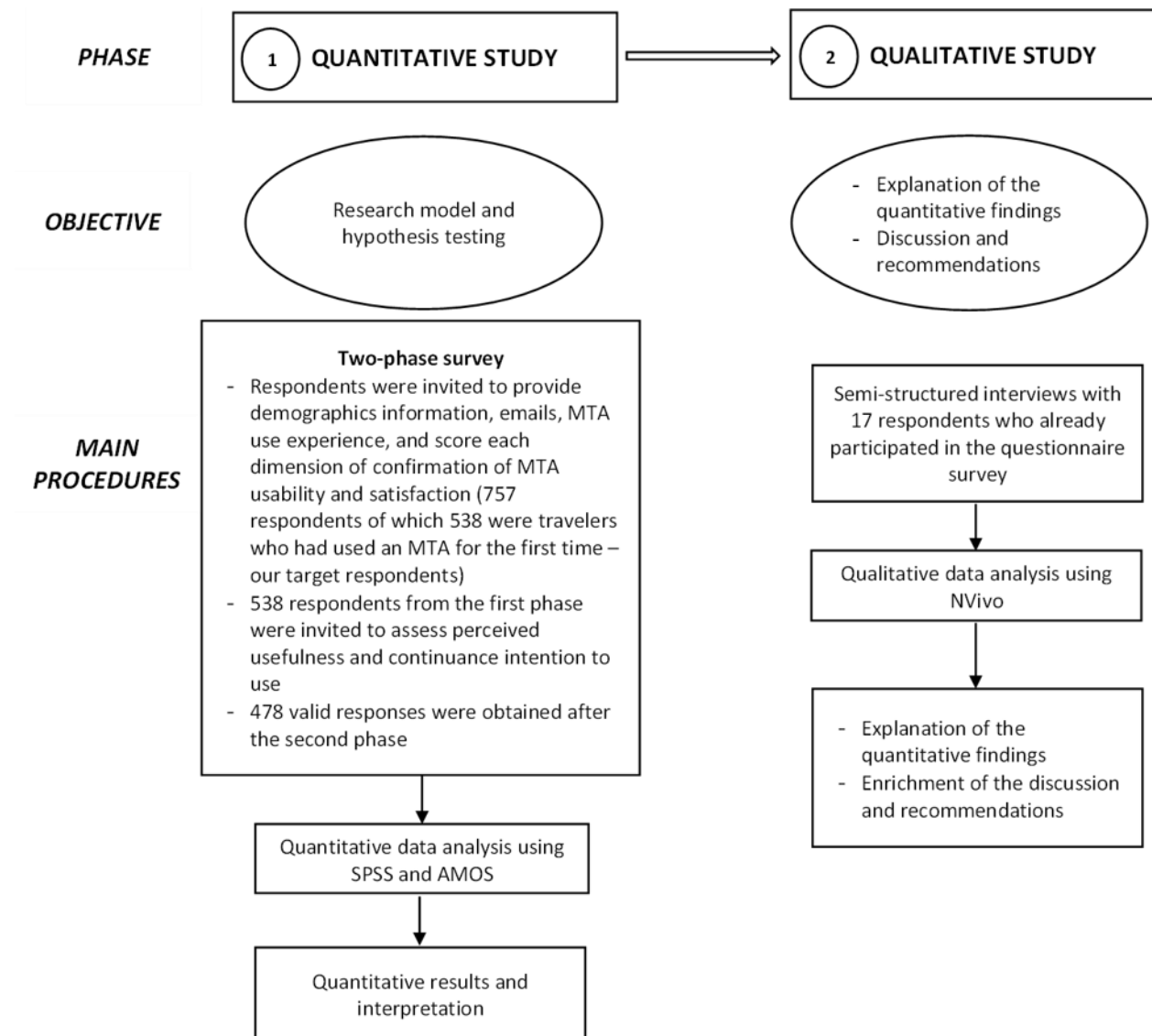
4. Research design

Based on previous studies (e.g., Vo-Thanh et al., 2022), we adopted an explanatory sequential mixed-method design. Accordingly, the additional qualitative study allowed us to gain a deeper insight into the quantitative study's findings by examining why and how various features of an MTA (i.e., confirmation of MTA usability) could affect travellers' continuance intention to use it. The qualitative study also helped us better understand the mediating mechanism of perceived usefulness and satisfaction in the relationship between confirmation of MTA usability and continuance intention to use. The qualitative results were mobilised to enrich the discussion and implications sections. Beyond supporting the quantitative findings, the qualitative findings helped us understand why certain usability dimensions were more influential than others and why some hypothesised relationships were not statistically significant. The interview findings also contributed to theory development by contextualising the belief–affect–intention process within tourism consumption, in which travellers prioritise reliable information, convenience, and personalised support, thereby strengthening both theoretical interpretation and practical implications.

Figure 2 illustrates our research design.



Figure 2. Research design



Source: authors' own elaboration.

4.1 Quantitative study

4.1.1 Measures

To measure the constructs in the research model (Figure 1), we mainly adopted the existing scales (Table 1). However, as our research specifically relates to MTAs, and the constructs were validated in other contexts, we followed Hardesty and Bearden's (2004) recommendation to refine these existing scales. Thus, we invited seven IS and tourism experts: two full professors in IS, one full professor in tourism, two mobile app developers, one destination manager, and one traveller accustomed to using apps while travelling.

As a result, all the items extracted from the existing scales were retained. To evaluate confirmation of MTA usability, we used a 7-point Likert scale (1 = "a lot worse than expected" and 7 = "a lot better than expected"). To assess the remaining variables, a 7-point Likert scale (1 = "strongly disagree" and 7 = "strongly agree") was used.

Relying on these scales, we developed the questionnaire. The back-translation technique was used to ensure language consistency. First, the questionnaire in English was translated into Vietnamese and then retranslated into English. Translation inconsistencies were examined by the authors, who are bilingual (English and Vietnamese). The questionnaire was tested with six travellers to ensure that the Vietnamese language used in the questionnaire is understandable. No changes were made after this test.

Next, we conducted a pilot study to adjust the items in each scale. Based on the results obtained from 123 Vietnamese travellers using Traveloka, one of the most popular MTAs in Vietnam, for the first time, nine items were removed (these nine items all had a



correlation coefficient of <0.3 , and after removing them, the reliability coefficients of the scales increased significantly), and 47 items were kept in the official questionnaire.

Table 1. Measurement scales

Concepts	Dimensions	Number of items	Sources
Mobile tourism app usability	<i>App design</i>	7	(Hoehle & Venkatesh, 2015; Tan et al., 2020); Expert study
	<i>App utility</i>	6	(Tan et al., 2020)
	<i>User interface graphics</i>	6	(Hoehle & Venkatesh, 2015)
	<i>User interface structure</i>	6	(Hoehle & Venkatesh, 2015; Tan et al., 2020)
	<i>User interface input</i>	5	
	<i>User interface output</i>	4	
	<i>App dependability</i>	4	(Tan et al., 2020)
Perceived usefulness		10	(Choi, 2018)
Satisfaction		4	(Bhattacharjee, 2001)
Continuance intention		6	(Kim et al., 2009); Expert study

Source: authors' own elaboration.

4.1.2 Data collection and data analysis

Quantitative data were collected via an online survey between November 2022 and February 2023. By means of the researchers' personal connections with travel agencies, tour guide associations, and individuals working in the tourism sector in Vietnam, the questionnaire link was sent to those organisations and individuals so that they could share the link on their social media channels, including Facebook, Zalo, and Instagram and ask travellers who have been with them to participate in the survey.

The questionnaire for official data collection started with two filter questions to select the right respondents: (1) Are you a Vietnamese domestic traveller? and (2) Did you use Traveloka for your last travel? Each question had two options: "Yes" or "No." If the answer was "No," the survey ended automatically. Importantly, the third question, "How many times did you use it?", helped us, after data collection, select only respondents who had used the given MTA for the first time for further analysis.

This decision is theoretically consistent with the expectation–confirmation perspective because continuance intention can begin to form immediately after initial usage experiences. First-time evaluations are important because users compare their initial expectations with the app's actual performance, which subsequently shapes their willingness to continue using the MTA.

Data analysis using SPSS 24.0 and AMOS 24.0 began with normality, common method bias, and multicollinearity tests, and descriptive statistics, followed by assessment of the measurement and structural models. We used 5,000 bootstrap samples to ensure high accuracy of the estimates.

4.1.3 Results

4.1.3.1 Sample profile

Descriptive statistics (Table 2) showed that, of 478 respondents, 49.4% were male and 50.6% were female; most were 25 years old or younger (30.4%). The majority of respondents had a two- or three-year university degree (65.3%).

Table 2. Respondents' characteristics

Characteristics		Frequency	%
Gender	Male	236	49.4
	Female	242	50.6
Age	25 years old or under	146	30.4
	From 26 to 35 years old	138	28.9
	From 36 to 45 years old	100	20.9
	Over 45 years old	94	19.7
Highest academic level	Professional education diploma	86	18.0
	Two-year university degree	116	24.3
	Three-year university degree	196	41.0
	Master's degree or higher	80	16.7

Source: authors' own elaboration from survey's data.



4.1.3.2 Common method bias and multicollinearity

To reduce common method bias, in addition to the two-phase survey, other procedural remedies were also employed. First, we ensured that potential respondents fully understood the questionnaire. Thus, it was written in plain language, avoiding complex sentences, double-barrelled elements, and vague terms, and naming the scale points. Moreover, potential respondents were provided with a cover letter that explicitly highlighted the value of their contribution to our research, which helped improve their willingness to respond to questions (Vo-Thanh et al., 2022). Finally, the questionnaire was tested with six travellers who had used Traveloka within the last six months.

Statistical remedies were also applied. Harman's single-factor test, recommended by Podsakoff et al. (2003) was performed. The result indicated that the first factor only accounted for 21.12% of the 60.08% explained variance. Therefore, common method bias was not a serious issue in this study. We addressed potential multicollinearity by examining the variance inflation factor (VIF) values. The results revealed that the inner VIF values ranged from 1.35 to 3.29 (<10), indicating no multicollinearity.

4.1.3.3 Measurement model evaluation

The SEM results showed that the research model fits the data well: Chi-square/df = 2.208 (<3), GFI = 0.840 (>0.8), TLI = 0.908 (>0.9), CFI = 0.903 (>0.9), and RMSEA = 0.050 (<0.08). Most relationships in the model were statistically significant ($p < 0.05$), except for H1a and H2c, which were not supported.

The Cronbach's alphas ranged from 0.784 to 0.901. Confirmatory factor analysis (CFA) showed that composite reliability (CR) ranged from 0.769 to 0.903 (>0.7). All standardised estimates were greater than 0.5. Average variance extracted (AVE) also ranged from 0.523 to 0.700 (>0.5) (Table 3). Therefore, the reliability and convergent validity of the scales were guaranteed (Hair et al., 2020).

Table 3. Results of confirmatory factor analysis

Constructs and items	Cronbach's alpha	Standardized estimates	CR	AVE
1. Confirmation of Mobile Tourism App Usability (CMTAU)				
App Design (CADS)	.865		.867	.523
CADS3 (The MTA launches quickly and allows me to start using it instantly)		.818		
CADS4 (The MTA flips the content over if I change the orientation of the mobile device (horizontal or vertical))		.786		
CADS2 (The MTA allows me to save the data automatically and restart where I left off previously)		.723		
CADS5 (Generally speaking, the MTA is well designed)		.690		
CADS1 (The MTA integrates branding effectively)		.696		
CADS6 (I am very satisfied with the overall design of the MTA)		.607		
App Utility (CAUI)	.784		.769	.527
CAUI2 (The MTA makes searching for information easy)		.793		
CAUI5 (In general, the MTA is of value to me)		.703		
CAUI1 (The MTA allows me to connect with other people)		.683		
CAUI3 (The MTA is very functional)		.571		
CAUI4 (The MTA serves its purpose well)		.562		
Interface Graphics (CUIG)	.813		.820	.534
CUIG3 (My intention is to continue using the MTA rather than use any alternative means (traditional channels))		.786		
CUIG1 (The MTA uses rich, beautiful, and engaging graphics that draw me into the application)		.767		
CUIG2 (The MTA uses real-life icons or pictures to illustrate the functionality (e.g., trash can for deleting items))		.700		
CUIG4 (Overall, I think that the graphics displayed on the MTA are designed effectively)		.663		
Interface Structure (CUIS)	.864		.869	.625
CUIS2 (The MTA lists the most frequently used operations at the very top)		.802		
CUIS4 (I am very satisfied with the way the MTA is structured)		.813		



Constructs and items	Cronbach's alpha	Standardized estimates	CR	AVE
CUIS1 (The layout of the MTA makes it easy for me to locate the content I need)		.831		
CUIS3 (Overall, I think the MTA structures information effectively)		.711		
Interface Input (CUII)	.839		.848	.531
CUII3 (The MTA allows me to enter my preferences or information easily (e.g., easy to input data, offer the fields to choose from that I do not have to type in text))		.790		
CUII1 (The MTA uses immediately obvious controls)		.807		
CUII4 (The MTA does not request that I modify the user setting within the application)		.794		
CUII2 (The MTA makes use of fingertip-size buttons)		.635		
CUII5 (I am very satisfied with the input mechanisms of the MTA)		.589		
Interface Output (CUIO)	.901		.903	.700
CUIO3 (The MTA uses terminology that is comprehensible)		.845		
CUIO4 (Overall, I think that the MTA presents content effectively)		.896		
CUIO2 (The content of the MTA is presented in a format that suits me)		.818		
CUIO1 (I find it easy to read the information in the MTA)		.764		
App Dependability (CADE)	.878		.878	.643
CADE3 (I am satisfied with the way the MTA operates from start to finish)		.831		
CADE1 (The MTA works smoothly from start-up to exit)		.820		
CADE4 (I am happy with how the MTA operates from start to finish.)		.773		
CADE2 (I can depend on the MTA to work from start to finish)		.783		
2. Perceived Usefulness (PEUS)	.899		.900	.600
PEUS2 (Using the MTA helps me perform many things more conveniently)		.850		
PEUS5 (Using the MTA fits with my schedule)		.797		
PEUS3 (Using the MTA enables me to access a lot of useful information)		.731		
PEUS1 (Using the MTA helps me accomplish things more quickly)		.801		
PEUS6 (Using the MTA fits any location, whenever I go)		.751		
PEUS4 (Using the MTA is an effective way to manage my time)		.709		
3. Satisfaction (SATI)	.845		.848	.583
SATI3 (Frustrated ... Contented)		.786		
SATI4 (Delighted ... Terrible)		.791		
SATI2 (Very Pleased ... Very Displeased)		.795		
SATI1 (Very Dissatisfied ... Very Satisfied)		.675		
4. Continuance Intention (CONT)	.897		.898	.639
CONT5 (I intend to use the given MTA even if I am not planning to travel in the very near future)		.849		
CONT2 (I intend to continue my use of the MTA in the future)		.773		
CONT3 (I intend to increase my use of the MTA in the future)		.807		
CONT4 (I would keep using the MTA as regularly as I do now)		.798		
CONT1 (My intention is to continue using the MTA rather than use any alternative means (traditional channels))		.766		

Source: authors' own elaboration.

Discriminant validity was assessed by comparing the square roots of AVE with correlation coefficients. The results in Table 4 indicated that the Maximum Shared Variance (MSV) was lower than AVE and that all correlation coefficients were less than the square roots of AVE, thereby ensuring discriminant validity of the scales (Hair et al., 2020).



Table 4. Discriminant validity

	MSV	PEUS	CONT	CADS	CUIO	CUII	CADE	CUIS	CAUI	SATI	CUIG
PEUS	.246	.726									
CONT	.176	.417***	.799								
CADS	.222	.357***	.330***	.723							
CUIO	.173	.338***	.315***	.256***	.836						
CUII	.130	.356***	.324***	.043	.133*	.729					
CADE	.199	.446***	.264***	.282***	.329***	.360***	.802				
CUIS	.194	.441***	.282***	.315***	.312***	.334***	.281***	.791			
CAUI	.122	.274***	.279***	.349***	.290***	-.011	.048	.099†	.726		
SATI	.246	.496***	.419***	.471***	.416***	.300***	.425***	.411***	.309***	.771	
CUIG	.158	.398***	.156**	.382***	.026	.346***	.187***	.375***	.070	.310***	.731

Note: † $p < .100$; * $p < .050$; ** $p < .010$; *** $p < .001$; square roots of AVE are on the diagonal

Source: authors' own elaboration.

4.1.3.4 Structural model evaluation

H1b,c,d,e,f,g and H2a,b,d,e,f,g were all statistically significant ($p < .05$), except for H1a and H2c ($p > .05$) (Table 5).

Table 5. Results of hypotheses testing

Hypothesis	Path	Coefficient	R ²	p	Result
H1:					
H1a	CADS→PEUS	.068	.623	.249	Rejected
H1b	CAUI→PEUS	.050*		.045	Supported
H1c	CUIG→PEUS	.170**		.004	Supported
H1d	CUIS→PEUS	.125*		.025	Supported
H1e	CUII→PEUS	.121*		.031	Supported
H1f	CUIO→PEUS	.152**		.005	Supported
H1g	CADE→PEUS	.174**		.001	Supported
H2:					
H2a	CADS→SATI	.225***	.638	.000	Supported
H2b	CAUI→SATI	.154**		.005	Supported
H2c	CUIG→SATI	.021		.737	Rejected
H2d	CUIS→SATI	.117*		.040	Supported
H2e	CUII→SATI	.127*		.027	Supported
H2f	CUIO→SATI	.071*		.019	Supported
H2g	CADE→SATI	.089*		.013	Supported
H3	PEUS→SATI	.144**	.506	.009	Supported
H4	PEUS→CONT	.199***	.202	.000	Supported
H5	SATI→CONT	.391***	.386	.000	Supported

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Source: authors' own elaboration.



Specifically, app dependability had the most significant influence on travellers' perceived usefulness (.174). App design significantly influenced travellers' satisfaction with using the tourism app (.225). Perceived usefulness had a positive influence on satisfaction with tourism app usage ($p < .01$), confirming **H3**. Both perceived usefulness and satisfaction had a positive effect on continuance intention to use ($p < .001$). Thus, **H4** and **H5** were supported. Although several coefficients were statistically significant, most effect sizes remained moderate, suggesting that continuance intention is shaped by multiple complementary usability dimensions rather than by a single dominant factor. Therefore, the findings should be interpreted as offering partial explanatory power rather than fully explaining continuance behaviour.

4.2 Qualitative study

4.2.1 Qualitative data collection

Qualitative data were collected through semi-structured interviews in April 2023. Interviewees were selected from those who participated in the questionnaire survey using quota sampling (Teddle & Tashakkori, 2009). Interviews were carried out by one of the researchers. A three-stage protocol was followed: warm-up, development, and closing.

The semantic saturation criterion was used. Interviews were transcribed and translated from Vietnamese into English and back-translated. Each interview lasted from 25 to 50 minutes. The final qualitative sample included 17 interviewees.

4.2.2 Qualitative data analysis

The corpus was analysed using NVivo14 software. Two researchers worked together on the first four interviews to reach an agreement on the coding procedure. The corpus was then encoded separately, following the multiple-encoding procedure. The main findings of the quantitative study were used as key themes, including (1) dimensions of MTA usability that affect travellers' continuance intention to use, (2) the indirect effect of MTA usability on continuance intention to use through perceived usefulness and satisfaction, and (3) dimensions of MTA usability that most affect travellers' continuance intention to use. A new theme was added as the encoding progressed, featuring recommendations from travellers to improve the app. The Coding Comparison Query function was used to compare the qualitative results obtained by two researchers (Kirova & Vo-Thanh, 2019).

5. Discussion

In line with some previous studies mobilising the concept of mobile app usability (e.g., Hoehle & Venkatesh, 2015; Tan et al., 2020), this research revealed that confirmation of MTA usability is a multidimensional concept, consisting of seven dimensions: design, utility, interface graphics, interface structure, interface input, interface output, and dependability. Most of these dimensions are positively associated with travellers' perceived usefulness and satisfaction. In a certain way, this finding echoes some previous works (e.g., Bhattacharjee, 2001; Liu et al., 2023). However, compared to previous research, which mainly focused on common mobile apps, our study has the merit of precisely detailing various dimensions of MTA usability confirmation, thereby better explaining how MTA usability affects travellers' perceived usefulness and satisfaction. This important finding also allowed us to respond to the call by Tan et al. (2020) for further research to identify and improve the dimensions of mobile app usability, which are crucial to ensure that the app meets users' expectations.

Besides, the study extends this literature by demonstrating that the relative importance of usability dimensions may vary in tourism contexts, where travellers are highly sensitive to uncertainty, information quality, and real-time service support. Compared with previous studies focusing on general mobile apps, the present study demonstrates that travellers evaluate tourism apps not only by interface attractiveness but also by functional reliability and contextual usefulness during travel experiences.

After the first use of Traveloka, globally, I felt that it had good usability, [...] that it satisfied my travel purposes. The content has been updated regularly. Photos and user reviews have been helpful. The app worked stably. I had positive feelings about it. (I3)

We found that the relationship between confirmation of app design and perceived usefulness is not significant. This result differs from Lee et al. (2017), which indicates that perceived usefulness is influenced by design. Furthermore, our study showed that the confirmation of interface graphics does not affect travellers' satisfaction with MTAs. This finding is also different from previous studies on other types of mobile apps, which show that satisfaction is affected by interface graphics (Liu et al., 2018). In the tourism context, primarily characterised by intangible features and experiences, only design and/or interface graphics may not be sufficient, but additional factors such as information accuracy and benefits (e.g., promo, diversified offer, consumer feedback, etc.), combined with engaging graphics and beautiful design, may determine perceived usefulness and satisfaction. One possible explanation is that tourism app users may perceive visual design as a basic requirement rather than a source of functional value. Unlike food delivery or entertainment apps, when it comes to travel, users typically prioritize reliability, precision of information, and ease of booking since tourism choices carry greater uncertainty and financial risk. This difference may also reflect the experiential nature of tourism



consumption. While interface graphics can improve first impressions, travellers may evaluate satisfaction more heavily based on whether the app effectively supports trip planning, navigation, and decision making during the travel experience.

An app with engaging graphics, eye-catching colours, a beautiful design, and a quick launch will not immediately satisfy me. It also depends on other factors, such as the benefits it provides for my needs and the accuracy of the information I will get. An overwhelmingly colourful interface may confuse me. (I2)

The findings showed that perceived usefulness is positively related to satisfaction, implying that the utilitarian value of MTAs helps improve travellers' satisfaction. We also found that travellers' perceived usefulness and satisfaction positively affect their continuance intention to use. These findings corroborate some recent studies (e.g., Liu et al., 2023). The qualitative findings also highlighted several practical implications. Interviewees emphasised the importance of real-time updates, personalised recommendations, intuitive interfaces, and stable app performance. These insights suggest that MTA developers should prioritise both functional reliability and experiential personalisation to strengthen travellers' satisfaction and long-term continuance intention. Similar relationships among perceived usefulness, satisfaction, and continuance intention have also been confirmed in recent studies of mobile tourism and travel apps (Tan, 2025).

If the app meets my expectations, I will be satisfied and continue using it. Usefulness is also important. My intention mainly depends on my experience. (I13)

6. Contributions, limitations, and future research

6.1 Theoretical contributions

This study offers relevant contributions to the theory of expectation–confirmation and continuance intention to use an MTA by fulfilling the belief-affect-intention process at the post-usage stage. We conducted two studies using an explanatory sequential mixed-methods design, which enabled us to enrich the discussion and implications by drawing on travellers' actual viewpoints.

While previous research on mobile apps has mainly focused on the adoption, this study extends the scope to the post-usage stage. In tourism scholarship, studies on post-adoption behaviour (e.g., continuance intention) remain underexplored (Choi, 2018), prompting us to develop a unique model that examines continuance intention to use by combining ECM with MAUCIF. By doing so, our study contributes to expanding the mobile app literature in two ways. (1) We explored the factors determining behavioural intention at the post-usage stage in the tourism context and strengthened the explanatory power of these factors. We highlighted the importance of app usability in research on continuance intention to use MTAs, particularly, and on IS in general. App usability is relatively new to technology continuance research (Hoehle & Venkatesh, 2015; Islam et al., 2017). Most existing studies have generally embedded usability, and only a few have investigated various dimensions of app usability (Islam et al., 2017; Tan et al., 2020). (2) The combination of two models (i.e., ECM and MAUCIF) allowed us to address the limitation of each model by better explaining the belief-affect-intention process in using mobile apps, contributing to both IS and tourism research. The ECM explains the belief (confirmation), affect (perceived usefulness and satisfaction), and intention (continuance intention) process for using mobile apps. However, the "belief" component has been understudied, as "confirmation" has been conceptualised as an aggregate construct and offers insufficient insight into its constituent dimensions (Bhattacharjee & Premkumar, 2004). Scholars argued that "confirmation" should be more specific by involving individual expectations and experiences towards a particular research context (Islam et al., 2017), which can influence continuance intention to use a technology. Additionally, the MAUCIF focuses only on the influence of app usability on continuance intention to use, omitting the "affect" component. By mobilising both "confirmation" and "MTA usability", we defined these two concepts in the context of MTAs as "confirmation of MTA usability", thereby fulfilling the belief-affect-intention process in the post-usage phase. These two concepts, "confirmation" and "app usability," were examined separately in the IS field. Based on the definitions of confirmation from Bhattacharjee (2001) and app usability from Hoehle and Venkatesh (2015), we defined "*confirmation of MTA usability*" as travellers' positive perception when evaluating the congruence between their expectations about the extent to which an MTA can be used to help them achieve their purposes accurately and efficiently and the actual performance of that MTA. Unlike Gong et al. (2020), we extended the "belief" component to the context of mobile apps by focusing not on the values that mobile technologies bring to users but on users' experiences with mobile apps, which has not yet been investigated in the current mobile apps literature.

6.2 Practical implications

Our findings imply that both belief and affect factors should be considered by MTA developers, tourism businesses, and policymakers to encourage travellers' continuance intention to use. This research also highlights the important role of affect as a bridge linking belief to intention. Therefore, enhancing the emotional connection between MTAs and travellers is an effective strategy to address the main concern about the one-time use of MTAs.



Regarding the belief, app design, app utility, and interface input were found to have the strongest effects on satisfaction; thus, developers should focus on these aspects. For app design, the qualitative study revealed that users particularly highlight the importance of data automatic saving for a quick resumption where they left previously and content adaptation according to the orientation of mobile device: *"The app saves data automatically, so I can restart where I left and, therefore, save a lot of time. I can also read the content regardless of the orientation of my mobile. I much appreciate it."* (I6). Two key points related to app utility that several interviewees valued are sharing and exchanging information with others and easily searching for information: *"Connecting with the travellers' community is essential. Their reviews are a reliable source for choosing the best option for travellers."* (I10). Travellers should also be able to share their experiences from the app on partner social networks, owing to their popularity and social and hedonic dimensions. To encourage them to post their experiences and, consequently, continue using the app, it would be beneficial to establish a compensation system that allows them to accumulate points for sharing experiences and receive rewards. For interface input, it is important to make the main functions immediately apparent and to use fingertip-sized buttons. The app should also be easy to input data and offer to users the fields to choose from so that they do not have to type in text: *"Because the screen of most mobile devices is small, the main functions of an MTA should immediately be obvious. If possible, I would prefer the fields to choose from instead of typing the text."* (I17).

The study highlighted that, among the various dimensions of MTA usability confirmation, app dependability has the strongest effect on perceived usefulness. This finding suggests that travellers evaluate the usefulness of an MTA not only on the information and services it provides but also on its reliability and consistency. When an application crashes, freezes, loads slowly, or displays inaccurate information, users may perceive it as unreliable and consequently question its overall usefulness, which can reduce their intention to continue using it. To enhance app reliability, MTA developers should establish a permanent, proactive maintenance system rather than relying solely on periodic updates. Specifically, developers should implement real-time monitoring tools to detect system failures, server outages, and performance bottlenecks before they affect users. Regular stress testing and compatibility testing should also be conducted across different operating systems, smartphone models, and software versions to ensure stable performance under various conditions. Given that tourists often rely on MTAs when travelling in unfamiliar environments, developers should prioritise minimising downtime and ensuring fast response times, particularly for critical functions such as navigation, booking, payment processing, emergency information, and attraction recommendations. Backup servers and cloud-based redundancy mechanisms can be adopted to maintain service continuity during periods of high demand or technical failures. Furthermore, app content should be continuously reviewed and updated to ensure the accuracy of destination information, transportation schedules, opening hours, pricing details, and event information. Providing users with outdated or incorrect information can undermine perceptions of dependability even when the application itself functions technically well. Destination management organisations and tourism service providers should therefore collaborate closely with app developers to establish mechanisms for timely information updates. Developers should also introduce user-friendly error-recovery features, such as automatic data saving, offline access to essential travel information, and clear explanations when technical issues occur. These features can reduce user frustration and preserve trust even when temporary disruptions arise. In addition, incorporating in-app feedback channels and regularly analysing user reviews can help identify recurring reliability issues and facilitate rapid corrective actions. From a managerial perspective, tourism organisations investing in MTAs should treat app dependability as a strategic quality indicator and allocate dedicated resources to continuous technical support, cybersecurity, system maintenance, and quality assurance. By ensuring stable performance, accurate information, and uninterrupted service delivery, MTAs can strengthen travellers' perceptions of usefulness, foster trust, and ultimately increase continued usage and long-term user loyalty.

In terms of interface graphics, structure, and output, business partners and MTA developers should work together to make the user experience more enjoyable. This can include using unique visuals that fit the app's values and positioning; employing engaging graphics; using real-life pictures or icons to illustrate various functionalities (e.g., trashcan for deleting items) (for interface graphics); laying out the app in a manner that is easy for travellers to locate the content they need; listing the most frequently used functions at the very top (for interface structure); presenting the content in a suitable and easy to read format; and using familiar terminology (for interface output).

Regarding the affect, tourism businesses, destination managers, and MTA developers need to cooperate to improve travellers' satisfaction and increase their awareness of MTAs' usefulness because these two variables positively influence travellers' continuance intention to use: *"It would be interesting to offer more special discounts to customers who often book services through the app. An MTA that proposes more special discounts makes me more satisfied, and my willingness to reuse it is higher."* (I7). It is also necessary to conduct MTA satisfaction surveys with frequent and targeted users to establish a set of MTA needs, helping improve MTAs continuously. Furthermore, it is suggested that a recommendation system be developed based on travellers' needs, geographic location, and friends' consumption experiences. To that end, MTAs should be able to capture information related to travellers' app usage to facilitate personalised recommendations and notifications: *"Photos and communication on the app need more investment and should be personalised. Each month, each season, and each destination must stand out. MTAs should promote in real time photos and specific offers at the destination where travellers are."* (I9).



6.3 Limitations and future research

In this study, the variables were measured with tourists only, based on their perceived technology affordance and value-in-use. Thus, it would be valuable to test our research model with other stakeholders (e.g., tourism businesses and destination managers) to enrich the findings. In addition, further research should be conducted in other countries where levels of technological development (i.e., technological infrastructure) and citizens' familiarity with the technologies differ. Therefore, scholars could explore the differences and/or similarities among travellers from various countries on this topic. Finally, this study only referred to one MTA (i.e., Traveloka). Future research should be expanded with other MTAs, which may help deepen the present findings.

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Corresponding author: Ethan Vo (ethanvonttu@gmail.com)

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