



An Extended Technology Acceptance Model (TAM) Incorporating Trust and Satisfaction Implications for ICT Adoption Intentions among Customers of Algerian Travel Agencies

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Abstract

In the era of widespread digitalization, understanding technology adoption behavior is a strategic issue for the Algerian tourism sector. This article is part of a process to enrich the Technology Acceptance Model (TAM), by integrating two external variables adapted to the context of travel agencies' digital services, namely trust and satisfaction.

A conceptual model was designed to assess how these two constructs affect TAM dimensions and, indirectly, the behavioral intent to adopt Information and Communication Technologies (ICTs). The empirical study was conducted with a sample of 315 customers of Algerian travel agencies and tested using structural equation modeling (SEM). The results highlight the central role of trust and satisfaction, together with the core TAM constructs, in shaping intentions to adopt ICTs. Beyond its theoretical contribution, this study proposes managerial implications for Algerian tourism professionals aiming to effectively implement their digital transition.

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1. Introduction

In a global context dominated by digital transformation, the advancement of information and communication technology (TIC), reinforced by the digital revolution, have profoundly reshaped the modalities through which commercial transactions are conducted (Bassimane & Mahdjar, 2025). In fact, technology now serves as a strategic infrastructure backbone, linking informational resources with commercial processes and enabling their seamless integration, supporting the systematic optimization of business activities, thereby improving overall performance, decision-making, and value creation within organizations (Bethapudi, 2013). At the same time, digital media have become an essential element to marketing strategies, prompting companies to use ICTs in order to boost consumer engagement and improve the quality of their services (Guo, Liu, He, & Shuhao, 2025).

The tourism sector is no exception to this dynamic; indeed, the rise of ICT has profoundly reconfigured its organization and operational practices, simultaneously creating new development prospects and significant challenges for professionals in the field (Alit, 2024). ICT also significantly enhances the consumer experience by providing rapid access to tourism-related information, products, and services, while facilitating the comparison of alternatives and enabling more informed and efficient decision-making. Furthermore, these technologies offer streamlined channels for communication with tourism providers and the submission of feedback, thereby improving service quality, enhancing consumer satisfaction, and contributing to the redefinition of competitive dynamics and the overall economic landscape of the tourism industry (Işkin, Prentice, & Şengel, 2024)

For travel agencies, the efficient integration of ICT represents an essential strategic lever to optimize organizational performance and enrich the customer experience (Garti & Makhloufi, 2024). In this sense, the adoption of advanced digital tools increases the accessibility of services and enables interaction with customers by providing comprehensive and real-time information on destinations, offers and booking options (Milojković, 2024). In addition, the use of digital tools, such as mobile apps, online booking systems, and web technologies, also facilitates access to global markets, improves operational efficiency, agency visibility, and the quality of the tourism experience (Al-Badarneh & Al-qawasmeh, 2023).

In light of this perspective, given that technological advances provide travelers with multiple touchpoints, influence their decisions and enable personalized experiences, and as consumers today rely extensively on online reviews, social media and digital recommendations to plan and book their trips, it becomes important for travel agencies to understand customers' behavioral intentions towards ICT-based services in order to remain competitive in a tourism environment that is increasingly reliant on digitalization and modern technologies (Işkin, Prentice, & Şengel, 2024).

Despite the growing importance of ICT in Algeria's tourism sector, research on the perception and adoption of digital services by customers of travel agencies remains limited. However, analyzing these behaviors is essential to effectively support the sector's digital transition. This is why our

study uses the Technology Acceptance Model (TAM), a recognized theoretical framework for explaining the intention to use a technology based on two key perceptions: perceived usefulness (PU) and perceived ease of use (PEOU). This model therefore provides a relevant basis for identifying the determinants of digital service adoption by customers (Kebab, 2025).

In another context, trust in electronic services within the Algerian tourism sector remains fragile, particularly due to concerns surrounding transaction security, the reliability of service providers, and the insufficiency of official regulations (Garti & Makhloufi, 2024). Besides, levels of satisfaction with previous digital experiences vary considerably from one user to another and are often influenced by inconvenient user interfaces or a lack of technical support (Alit, 2024).

Accordingly, this study aims to examine the combined influence of perceived usefulness, perceived ease of use, trust, satisfaction, and attitude on the intentions of Algerian travel agency clients to adopt ICT-based services, while also proposing a comprehensive explanatory model tailored to the specificities of the Algerian market. This approach seeks to better understand the underlying mechanisms that drive the adoption of digital services by travel agency customers. Based on what was presented, our research question is formulated as follows:

To what extent do customer satisfaction and trust favorably influence their intentions to adopt modern ICTs and digital services offered by travel agencies in Algeria?

In order to explore and appreciate the fundamental dimensions of this relationship, we formulated the following sub-questions:

- What are the different forms and theoretical foundations of ICT adoption in the tourism sector?
- How do digital interactions with ICT-based services influence key determinants of adoption, such as trust and satisfaction?
- To what extent do trust and satisfaction mediate the relationship between the TAM dimensions, PU and PEOU, and travelers' behavioral intentions toward digital tourism services?

Research objectives

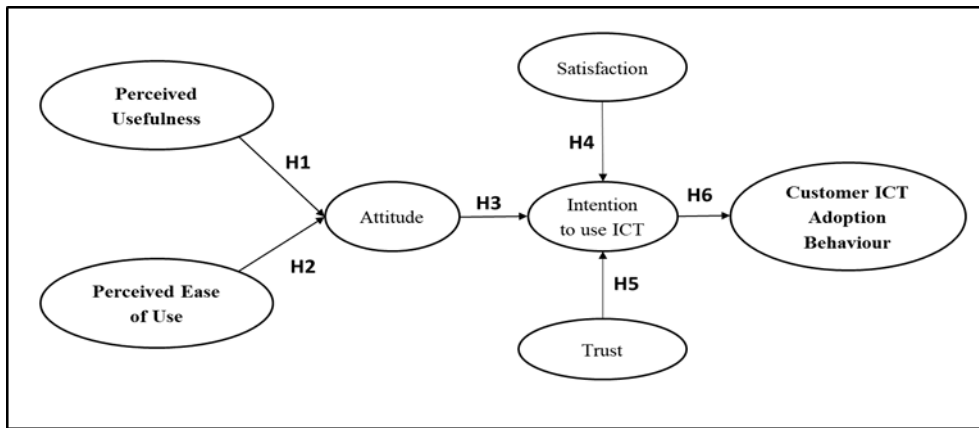
The objective of this study is to shed light on the mediating role of customer-related factors, trust and satisfaction, in the relationship between the dimensions of the TAM and customers' intentions to adopt ICT-based services within the context of Algerian travel agencies.

Research Hypotheses

Building on the theoretical foundations and prior scholarly literature, and drawing in particular on the framework proposed by Guo et al. (2025) as well as the model developed by Kebab (2025), this study conceptualizes trust and satisfaction as mediating variables between the core constructs of the Technology Acceptance Model (TAM), namely perceived usefulness (PU) and perceived ease of use (PEOU), and customers' intentions to adopt ICT-based services.

Accordingly, the model assumes that the influence of PU and PEOU extends beyond a direct effect, incorporating indirect pathways through trust and satisfaction. These mediating variables capture the relational and experiential dimensions of technology use, thereby providing a more comprehensive explanation of customers' adoption intentions. Based on this, the hypothetical model can be presented as follows:

Fig.1. The proposed conceptual model of the study



Source: Elaborated on the basis of the literature review and the extended TAM framework

Based on the proposed conceptual model and in response to the research question, the following hypotheses have been formulated:

Direct effect hypotheses

- **H1:** The perceived usefulness of ICT adopted by travel agencies positively influences customers' attitudes toward their use.
- **H2:** The perceived ease of use of ICT adopted by travel agencies positively impacts customers' attitudes toward using them.
- **H3:** Customers' attitudes toward ICT implemented by travel agencies positively influence their intention to use them.
- **H4:** Customer satisfaction positively influences their intention to adopt ICT-based services.
- **H5:** Customer trust positively influences their intention to adopt ICT-based services.
- **H6:** Intention to use ICT is positively associated with customers' ICT adoption behavior.

Mediating effect hypotheses

- **H7:** Attitudes toward the use of ICTs act as a mediating factor between perceived usefulness and clients' intent to use these technologies.
- **H8:** The intention to use ICT mediates customer satisfaction and ICT adoption behavior.
- **H9:** The intention to use ICT mediates the relationship between customer trust and ICT adoption behavior.
- **H10:** The intention to use ICT acts as a mediator between attitude towards ICT and ICT adoption behavior.

2. Literature review

2.1 Relevance of the TAM to explain the use of ICT in tourism sector

2.1.1. Theoretical basis of the Technology Acceptance Model (TAM)

Several theoretical frameworks originating from management and social psychology have been developed to explain individuals' intentions to adopt digital technologies. These include the Theory of Reasoned Action (TRA; 1975), the Technology Acceptance Model (TAM; 1989), the Theory of Planned Behavior (TPB; 1991), the Decomposed Theory of Planned Behavior (DTPB; 1995) and, more recently, the Unified Theory of Technology Acceptance and Use (UTAUT; 2003) (Escobar-Rodríguez & Carvajal-Trujillo, 2014).

Among these models, TAM, derived from the Theory of Reasoned Action (TRA) model, has been the most widely used to explain technology adoption as well as consumer behavior. Proposed by Davis (1989), it postulates that perceived usefulness (PU) and perceived ease of use (PEOU) influence users' attitudes toward a technology, which in turn condition their behavioral intentions, ultimately leading to the effective use of the system (Kebab, 2025).

Over time, the TAM remains one of the most relevant theoretical frameworks for analyzing users' intentions, post-adoption attitudes and behaviors toward new digital technologies, particularly (ZHANG, 2022). In the tourism sector, has emerged as a particularly pertinent theoretical framework for explaining how travelers, service providers and tourism destinations are using digital technologies such as mobile applications, augmented reality tools, social media platforms and online booking systems to enrich the tourism experience and improve the performance of the sector (Bethapudi, 2013). When applied to travel agency platforms, TAM emphasizes travelers' beliefs that digital technologies enhance the efficiency, convenience, and overall quality of their travel planning and experience, including access to personalized itineraries, real-time updates, and cost-effective options (İşkin, Prentice, & Şengel, 2024).

According to Fred Davis (1989), the Technology Acceptance Model (TAM) is based on two fundamental beliefs that directly influence users' intention to use a technology and their adoption behavior: perceived usefulness (PU) and perceived ease of use (PEOU). These core dimensions constitute the foundation of the model and play a central role in explaining technology acceptance:

❖ **Perceived Usefulness (PU):** it refers to the degree to which an individual believes that a technology improves their efficiency, productivity, or the overall value of their experience. In the tourism sector, for example, it concerns the ability of reservation systems, mobile applications or virtual platforms to optimize trip planning and facilitate decision-making (Kebab, 2025).

❖ **Perceived Ease of Use (PEOU):** It reflects users' belief that new ICTs require little effort to navigate, due to their intuitive interfaces, clear instructions, and seamless functionality across different devices, as technologies perceived as easy to use reinforce a favorable attitude and increase motivation to adopt them (Gefen, Efrain, & Moshe, 2003).

Several previous studies have shown that these two dimensions constitute major determinants of behavioral intent, establishing a link between cognitive beliefs, effective acceptance and sustainable use of technologies, particularly in the context of digital platforms and online travel services (Guo, Liu, He, & Shuhao, 2025).

2.1.2. Attitude and intention to use as predictors of ICT adoption

Within ICT adoption research, behavioral intention reflects the degree of an individual's readiness or willingness to engage in a future behavior involving the use of ICT, in other words, it captures the level of motivation the individual assigns to the execution of that prospective behavior (Verplanken & Orbell, 2022), while attitude refers to a psychological disposition, favorable or unfavorable, towards an object or action. According to (Davis, Bagozzi, & Warshaw, 1989) attitudes toward the use of technology are a direct result of cognitive beliefs about its perceived usefulness and ease of use, thus playing a main mediating role between these beliefs and behavioral intention. A positive attitude significantly increases the likelihood of actual use, making intention to use one of the best predictors of future technological behavior (Gefen, Efrain, & Moshe, 2003).

To fully understand how people's perceptions are translated into concrete actions, it is necessary to examine the mediating role of attitudes in the ICT adoption process. Verplanken & Orbell (2022) point out that the attitude–behavior relationship can be modulated by three main dynamics:

- The attitudes expressed do not always reflect the deep dispositions of individuals and may be subject to cyclical adjustments or social desirability biases, thus attenuating their predictive power;
- Only strong, accessible and stable attitudes exert a consistent influence on behavior;
- In many cases, ICT use behaviors escape conscious deliberation and are more a matter of automated habits or pre-established behavioral scripts, making conscious attitudes marginal.

ICT is no longer just a tool for disseminating information, but has evolved into a strategic driver for creating value and customer loyalty, thereby positioning individuals' attitudes toward these technologies as a central element of the decision-making process (Liang, Zhao, Zhang, & Lu, 2025). Consequently, the effective adoption of ICT by travelers and travel agency customers is contingent upon several key attitudinal determinants, including perceived personal interest, perceived ease of use, perceived usefulness, anticipated hedonic and functional benefits, and the perceived relevance of digital tools throughout the purchasing journey. Moreover, a range of external factors, such as individual characteristics, prior experiences, and technology-related

perceptions, also play a significant role in shaping users' attitudes and behavioral intentions (Li & Shan, 2023).

2.1.3. The role of satisfaction and trust in shaping ICT adoption attitudes and behavior

Customer satisfaction is a particularly relevant subject of study, being one of the main determinants of ICT adoption behavior. According to Seow et al. (2024) it can be defined as the perceived gap between expected and actual service or product performance, in other words, it represents an overall evaluation of the performance of an offer, whether it is a product or a service, based on the consumer's personal experience. According to Giese & Cote (2000), satisfaction is based on three fundamental components:

- An emotional or cognitive response;
- A targeted object, which may concern expectations, the product, the consumer experience or the service provided;
- A temporal dimension, indicating that the response occurs at a specific time, such as after consumption or as a result of accumulated experience.

In the tourism industry, satisfaction refers to the extent to which the services and products delivered align with tourists' needs, expectations, and desires, as well as with their overall consumption experience (Al-Badarneh & Al-qawasmeh, 2023). Accordingly, the adoption of ICTs by travel agencies represents a critical lever for enhancing customer satisfaction. Notably, the deployment of ICTs in informal digital contexts, such as social media platforms, can further reinforce satisfaction by facilitating interactive communication and relational proximity, thereby fostering more engaging and personalized experiences (Alit, 2024).

Trust, on the other hand, can be defined as the tourist's confident belief in a travel agency's integrity, reliability, and goodwill. It reflects the expectation that the agency will act honestly, honor its commitments, and engage in open and transparent communication. Trust is commonly conceptualized through two core dimensions (Moliner, Rosa, & Luís, 2007):

- Honesty, which denotes the perception that the agency behaves in a reliable and dependable manner;
- Benevolence, which refers to the belief that the agency genuinely prioritizes the tourist's interests and well-being.

ICTs then become a main facilitator of access to information, carrying out transactions and interaction with tourism services. When customers perceive these tools as reliable, secure, and tailored to their needs, they are more likely to adopt and use them sustainably, reinforcing their role in the contemporary tourism experience (Dutton & Shepherd, 2006).

Besides, factors such as the protection of personal data, perceived trustworthiness, brand credibility, and the fulfillment of commitments and promises play a crucial role in reinforcing trust. When consumers perceive these elements positively, they concurrently enhance both trust and satisfaction, which in turn fosters greater loyalty, strengthens purchase intentions, and encourages a higher level of ICT adoption throughout the tourism experience (Alit, 2024).

2.2. Integration of ICT in the tourism sector

2.2.1. Digital transformation and integration of ICT in tourism

Over recent decades, the development of ICT has profoundly reconfigured the marketing paradigms. As a result, it has helped to redefine commercial strategies, guide growth dynamics and exert a major influence on the performance and profitability of organizations. In addition, this transformation has substantially changed the mechanisms by which companies interact with consumers and process information, in environments that are now highly digitized (Garti & Makhoulfi, 2024). Accordingly, ICT provides tourism companies, in particular travel agencies, with a set of powerful tools such as social platforms, CRM systems, email automation, chatbots and marketing automation solutions. These technologies not only make it possible to target customers more effectively, but also to personalize the interaction and improve the quality of service (Escobar-Rodríguez & Carvajal-Trujillo, 2014)

The growing adoption of digital technology is taking place in a context where travelers' behaviors are changing profoundly. Consumers are searching, accessing, and analyzing information in new ways, while their planning, booking, learning, and interaction practices are becoming increasingly digital. As Dutton & Shepherd (2006) points out, this digital transformation also changes cognitive processes, influencing creativity, attention and the way individuals apprehend digital content.

Within this changing landscape, travel agencies play a strategic role in the tourism sector, that remains a major pillar of the service economy, generating jobs, foreign exchange and investment (Seow, Foroughi, & Choong, 2024). Their performance and sustainability now depend heavily on their ability to effectively integrate ICTs and adapt to the expectations of connected travelers (Megawati, Otok, & Purnomo, 2025). Digital solutions are profoundly transforming the activity of agencies (Guo, Liu, He, & Shuhao, 2025):

- They facilitate travelers' access to visual, interactive and personalized information on destinations;
- They improve the comparison of offers and support more informed decision-making;
- Online platforms cover the entire customer journey, from initial research to booking and payment, simplifying procedures and enhancing convenience.

2.2.2. The challenges of e-tourism and ICT for the development of the tourism sector in Algeria

The tourism industry is highly dependent on information, and its evolution has closely followed the advancement of ICT. Information management, through its collection, creation, storage, consultation and transfer, plays a critical role throughout the tourism value chain (Bethapudi, 2013). In this sector, ICT has reduced costs, improved operational efficiency, minimized labor requirements, and increased the quality of services. These innovations have also streamlined business operations and made travel experiences more convenient and efficient (Happ & Ivancsó-Horváth, 2018).

Fig.2.The strategic integration of ICT and e-tourism in tourism management



Source: (Bethapudi, 2013)

In light of the figure 2 and as supported Happ & Ivancsó-Horváth (2018), e-tourism relies on the production and sharing of relevant digital content within interactive environments. These technological devices offer the possibility of generating simulated tours and virtual experiences that can not only evoke, but sometimes reproduce in a very realistic way the conditions of a real trip.

In recent years, Algeria has embarked on a process of adaptation aimed at keeping pace with global technological development. In this context, the implementation of e-tourism appears to be inseparable from the deployment of e-commerce, since the digital transformation of the tourism sector is largely based on the rise of online transactions and marketing practices. However, e-commerce in Algeria remains underdeveloped in comparison to many countries, including those in the region, which in turn limits the expansion of e-tourism, of which it is a key pillar (Alit, 2024).

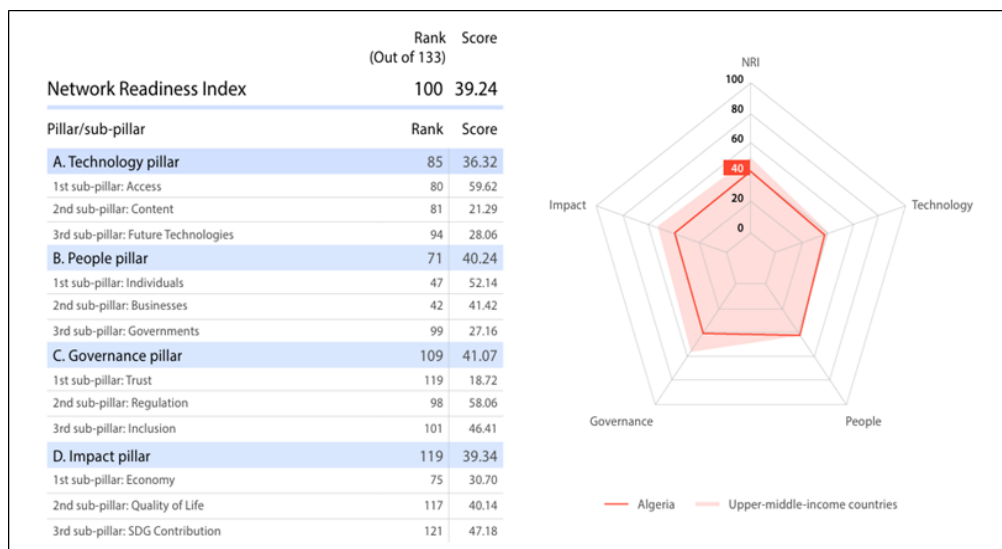
2.2.3. The digitization of tourism in Algeria: current status and prospects

Tourism remains one of the fastest-growing and most influential sectors in the global economy (Hadood, Ben Saleh, & Emgeg, 2021). According to the World Travel and Tourism Council (WTTC), the sector contributed approximately US \$10.9 trillion to global GDP in 2024,

representing around 10% of the total economic output. This performance reflects the industry's strong post-pandemic recovery and its expanding role as a cornerstone of global economic activity. In Algeria, the total contribution of Travel & Tourism — including direct, indirect, and induced impacts — was estimated at around 5.8 % of national GDP in 2023, with forecasts projecting this share to rise modestly to about 6.1 % in 2024. The direct contribution alone accounted for roughly 2.1 % of GDP in 2023 (WTTC, 2024). Beyond its growing economic contribution, the sustained success of the tourism sector increasingly relies not only on the inherent appeal of destinations but also on the effective integration of ICTs and the willingness of local residents to both support tourism activities and embrace technological adoption (Alit, 2024).

Despite the implementation of various projects and strategies, digitalization in Algeria is progressing slowly, unlike the progress observed in countries such as Singapore, the United Arab Emirates, Qatar or Bahrain. This lag is explained by an economic strategy focused on oil rents rather than on a knowledge-based economy (Bassimane & Mahdjar, 2025). According to the latest annual report of the PORTULANS Institute for 2024, which covers 134 countries, Algeria remains poorly ranked at the global level. It is positioned around the 100th place worldwide, with an overall score estimated between 38 and 40 points. These results, reflect to a significant digital lag, highlight the challenges that the country still needs to overcome in terms of digitalization and technology adoption (Dutta & Lanvin, 2024).

Fig.3.Ranking of Algeria according to the Network Readiness Index (2024)



Source: Dutta & Lanvin, The Network Readiness Index 2024: Algeria

In this regard, aiming to boost the tourism sector and promote the integration of technological advances, tourism organizations in Algeria are working to strengthen institutional communication and bring the administration closer to citizens. In light of this framework, a number of platforms and websites have been set up to interact with public authorities, tourism institutions and tourists. As noted by Alit (2024), these include:

⇒ For public authorities (traditional chambers of industry, offices, training schools affiliated to the Ministry of Tourism or tourism directorates): communication is mainly carried out by e-mail (Yahoo, Outlook, Google, etc.).

⇒ For tourism institutions (hotels, tourist vehicles and travel agencies): several electronic platforms have been established. Among these, the platform dedicated to travel and tourism agencies enables them to:

- Monitor the files and procedures for opening branches;
- Supervise investment projects for the creation of hotels or tourist establishments;
- Ensure the monthly monitoring of tourist activities and traditional crafts at the level of state directorates.

⇒ For tourists or citizens: various digital solutions have been introduced:

- The electronic platform visitalgeria.dz, launched in 2018, it is a complete tourist guide, centralizing information on the different regions of the country, tourist sites, hotels, restaurants and means of transport, while offering intuitive and facilitated navigation for users.
- The official websites of tourism organizations (Ministry of Tourism: mta.gov.dz, National Tourist Office: ontdz.org, ONAT: onat.dz, HTT Group: htt.com, ANART: anart.dz, CNAM: cnam.dz) are now connected to social networks, in order to strengthen interaction with the public and disseminate information in real time.
- Integration of innovation and ICTs into the Tourism Development Master Plan, through several initiatives (Belahcene & Brahim Ali, 2025):
 - The digitalization of the tourist administration;
 - The creation of the electronic portal of the Ministry Tourism and Traditional Industries (MTTI);
 - Activation of digital marketing strategies, via websites, Facebook pages, flyers and multimedia materials.
- The increase in the total number of operational travel agencies reaching 5,570 in 2024, accompanied by the widespread adoption of electronic payment methods, aimed at facilitating transactions and improving the quality of services in the tourism sector (Algeria Invest, 2025).

3. Empirical research methodology

3.1. Construction of the data collection instrument

In order to ensure data comparability and enable the application of statistical analyses, the qualitative variables initially formulated using five response categories were converted into a five-point Likert numerical scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). This methodological choice is based on the widespread use of this scale in the social sciences, given its ability to progressively measure the intensity of perceptions while remaining intelligible to respondents (Joshi, Kale, Chandel, & Pal, 2015). As detailed in Appendix 1, the measurement items were developed through an extensive review of the relevant literature.

- The variables were then grouped according to the theoretical dimensions of the adopted model:
 - ↳ Determinants of technology acceptance: perceived usefulness (PU) and perceived ease of use (PEOU);
 - ↳ Behavioral variables: attitude towards ICT (ATT) and intention to use (ITU);
 - ↳ Relational variables : satisfaction (SAT) and trust (TR) ;
 - ↳ Principal dependent variable: Customer ICT usage behavior (CUB).
- At the same time, the respondents' profile was characterized using socio-demographic variables (gender, age, level of education and occupation), complemented by indicators related to their interaction with travel agencies, including frequency of use, preferred communication channel (physical agency, telephone, website, social media, etc.) and level of familiarity with digital tools.
- A typology has been developed to classify respondents:
 - ↳ Advanced users: regular use of digital platforms to organize their travel;
 - ↳ Intermediate users: occasional use of digital tools;
 - ↳ Beginner users: low or very limited use of ICT.

3.2. Results presentation and discussion

3.2.1. Sample design and descriptive statistics

The study's target population includes customers of Algerian travel agencies exhibiting different levels of digital engagement, including:

- The adoption of booking software such as IProBooking, YoucefBooking, and FennecBooking, which constitute digital platforms developed within the Algerian tourism ecosystem to support the online management of travel services, including reservation processing, access to information, and customer interaction;
- Social media presence ;
- The use of online forms or contact interfaces;
- Partial or full deployment of transactional websites such as h24voyages.com, which allows users to browse, book, and manage travel services online.

This technological diversity has enabled the identification of agencies' digital integration profiles and, in turn, has facilitated the analysis of customers' usage behaviors and their intentions to adopt digital tools.

The questionnaire was administered directly to clients, using a combination of face-to-face interactions and online methods via social media, over a period of three-month. Out of 406 distributed questionnaires, 315 were fully completed and returned, yielding a response rate of 53%, which is considered satisfactory in social science research examining individual behaviors and perceptions (Bhattacharjee, 2012, p. 73). These 315 completed questionnaires were retained for analysis, ensuring the reliability and representativeness of the results.

3.2.2. Sample descriptive analysis

Table 1 presents the descriptive statistics of the respondents' demographic characteristics. It provides an overview of the sample composition, highlighting the distribution of respondents across different demographic categories and offering context for the interpretation of subsequent analyses:

Table 1. Demographic characteristics of the study sample

Description	Items	Frequency n=315	Percentage (%)
Gender	Male	243	77.2
	Female	72	22.8
Age	Less than 25	39	12.4
	25–34	194	61.5
	35–44	59	18.7
	45 and above	23	7.4
Occupation	Student	24	7.6
	Government	197	62.7
	Private sector	83	26.3
	Others	11	3.4
Educational level	Primary	8	2.4
	Secondary	73	23.2
	Undergraduate	193	61.3
	Postgraduate	41	13.1
Frequency of use of travel agencies	Rarely (1 to 2 times per year)	239	75.9
	Occasionally (3 to 5 times per year)	65	20.6
	Regularly (more than 5 times per year)	11	3.5
Ways to interact with travel agencies' ICTs	At a physical agency	79	25.1
	Online (website, application, social media)	190	60.4
	By phone	46	14.5
Familiarity with ICTs for travel planning	Yes	281	89.3
	No	34	10.7

Source: Elaborated by the authors

- The study sample comprised 315 respondents, with a majority being male (243 individuals, representing 77.2%). This predominance may reflect a higher representation of men in the utilization of, or interest in, digital tourism services.
- In terms of age, the majority of participants (61.4%) were between 25 and 35 years old, followed by those aged 36–45 (18.6%). The predominance of young adults is particularly conducive to technology adoption, as these age groups are generally more familiar with digital tools, which can support the integration of ICTs within the tourism sector.

- Regarding occupation, 62.8% of respondents work in the public sector, while 26.5% are employed in the private sector. This socio-economic profile suggests a stable and active population, which is therefore potentially more able to use or finance online tourism services.
- Concerning educational qualifications, it is generally high, the overall level is relatively high, with 61.3% of respondents holding a bachelor's degree and 13% completed postgraduate studies. This level of education suggests a well-informed population capable of understanding and using digital systems effectively.
- In terms of behaviors, the analysis reveals that 75.8% of respondents rarely use travel agencies (1 to 2 times a year). This can be explained by the rise of digital solutions that allow users to organize their own trip. In addition, interactions with travel agencies are predominantly conducted online (60.4%), significantly exceeding those carried out through in-person visits to the agency (25.1%). This aspect confirms the fundamental place of digital technology in the client-agency relationship.
- Furthermore, familiarity with digital tools is notably high, with 89.3% of respondents reporting the use of ICT to plan their trips, which indicates a strong potential for adoption of digital solutions in the Algerian tourism sector.
- Overall, the respondents are predominantly young, well educated, and highly digitally literate, which constitutes a favorable context for the integration of ICT within Algerian travel agencies. However, the relatively low frequency of visits to traditional agency branches may reflect both structural constraints in the current service offer and a growing preference among Algerian consumers for digital autonomy and online self-service solutions, underscoring the need for further modernization of travel agencies' digital practices.

3.2.3. Structural model results: The role of trust and satisfaction in the extended TAM explaining ICT adoption intention among Travel Agency customers in Algeria

First, we presented the results of the measurement model test through confirmatory factor analysis (CFA), in order to evaluate the reliability and validity of the scales used. Subsequently, we showed the results of the structure model test, which allowing us to confirm or refute our hypotheses.

A comprehensive model includes both a measurement model, which defines latent variables based on their observable indicators, and a structure model, which describes the relationships between these variables. For the purposes of our analysis, the model studied includes four exogenous variables: Perceived usefulness, perceived ease of use, customer satisfaction and trust, as well as three endogenous variables: customer attitudes towards ICT, intention to use ICT, and ICT adoption behavior.

Since our data are ordinal and have a non-normal distribution, as confirmed by the Shapiro-Wilk test ($p < 0.05$, see Appendices), we proceeded to estimate the model by structural equations (SEM). This method is considered more robust than maximum likelihood estimation for non-normally distributed ordinal data (Pek & Wong, 2018), thus ensuring that reliable parameters were obtained for our study.

3.3. Measurement model evaluation using confirmatory factor analysis (CFA)

Confirmatory factor analysis (CFA) is used to assess the validity of measurement scales, with a particular focus on convergent validity and discriminant validity (Mueller & Hancock, 2018).

3.3.1. Analysis of Model Fit Indices

The modification indices provided by CFA highlighted certain parameters that did not make a significant contribution to the model. On this basis, the least-performing items were removed and some error covariances were added when theoretically justified.

The aim of these adjustments was to improve the validity of the model while maintaining the coherence of the theoretical framework chosen.

Table 2. Evaluation of the model's goodness-of-fit indicators

Index	Initial model	Adjusted Model	Recommended threshold*
CFI	0.795	0.921	≥ 0.90
TLI	0.756	0.903	≥ 0.90
RMSEA	0.0464	0.041	≤ 0.06
IC95% RMSEA	[0.0393 ; 0.0534]	/	≤ 0.08
SRMR	0.085	0.056	≤ 0.08
χ^2/ddl	/	2.10	≤ 3

*Recommended thresholds according to Hu & Bentler (1999)

Source: Results obtained via Jamovi (version 2.3.28)

With reference to the acceptability thresholds widely recognized in the methodological literature (Hu & Bentler, 1999), and as shown in Table 2, the initial model did not fully meet the criteria for a satisfactory fit. Indeed, some indices, notably the CFI (0.795) and the TLI (0.756), were below the minimum threshold of 0.90, indicating insufficient quality of fit. Similarly, the SRMR value (0.085) was slightly above the recommended threshold of 0.08.

To address this situation, adjustments were made on the basis of the modification indices, which improved the model's fit to the data by removing certain correlations between error terms that were not theoretically justified.

The results of the adjusted model show a substantial improvement in the fit indices. As illustrated in the previously mentioned table, the obtained values now meet the recommended thresholds, notably for CFI (0.921) and TLI (0.903), which exceed the critical threshold of 0.90. The SRMR index also decreased to 0.056, falling within the acceptable range (< 0.08). In addition, the RMSEA

value (0.041), accompanied by a 95% confidence interval between [0.0393; 0.0534], confirms the model's good fit. Finally, the ratio $\chi^2/\text{ddl} = 2.10$ remains below the threshold of 3, indicating an acceptable fit to the data.

3.3.2. Analysis of reliability and convergent validity of the measurement model

The results presented in Table 3 indicate that the measurement model demonstrates a good fit to the data. All factor loadings (λ) exceed the minimum threshold of 0.30 and are statistically significant ($p < 0.001$), providing evidence that each observed indicator reliably represents its respective latent construct. This confirms the adequacy of the measurement model in capturing the intended theoretical dimensions.

Table 3. Internal Reliability and Convergent Validity Test

Variable	α	Ordinal α	AVE
PU	0.920	0.984	0.743
PEOU	0.935	0.983	0.782
ATT	0.919	0.970	0.739
ITU	0.924	0.978	0.753
SAT	0.924	0.989	0.754
TR	0.914	0.990	0.728
CUB	0.920	0.947	0.743

Source: Results obtained via Jamovi (version 2.3.28)

The reliability indices reveal a very high level of internal consistency of the measurement scales. The Cronbach's α values exceed the recommended threshold of 0.70, ranging from 0.914 to 0.935, indicating excellent reliability. Similarly, the Ordinal α values are exceptionally high, ranging from 0.947 to 0.990, which confirms the robustness of the scales when treating the data as ordinal, as is appropriate for Likert-type items.

Besides, the AVE values for all constructs are greater than 0.70, thus confirming a satisfactory convergent validity, since each construct explains more than 50% of the variance of its items. Taken together, these results demonstrate the methodological consistency of the measurement model and justify the transition to structural model analysis (SEM).

3.3.3. Discriminant validity

Discriminant validity was evaluated from the square root of the Average Variance Extracted (AVE) for each construct. As noted by Fornell & Larcker, discriminant validity is confirmed when the square root of construct's AVE is greater than its correlations with all other constructs. The results presented in Table 4 show that, for every construct, the square root of the AVE exceeds the corresponding inter-construct correlation coefficients, which confirms the existence of good discriminant validity.

Table 4. Evaluation of the discriminant validity of measuring instruments

Variables	PU	PEOU	ATU	ITU	SAT	TR	CUB
PU	0.86						
PEOU	0.110	0.884					
ATT	0.095	0.045	0.861				
ITU	0.073	0.096	0.054	0.867			
SAT	0.422	0.296	0.082	0.091	0.868		
TR	0.330	0.242	0.204	0.250	0.384	0.853	
CAB	0.234	0.171	0.144	0.177	0.22	0.354	0.861

Source: Results obtained via Jamovi (version 2.3.28)

Overall, the findings indicate that the measurement model applied in this study exhibits strong reliability and validity. The constructs used to examine the influence of digital tools implemented by travel agencies on customers' ICT adoption behavior are therefore empirically sound, internally consistent, and appropriately specified for subsequent structural analysis.

4. Results of the structural equation model

In this research, the Structural Equations Model (SEM) was developed to empirically examine the hypothetical relationships between the variables in the proposed model. All statistical analyses were carried out using Jamovi software (version 2.3.28), an open source tool specialized in data analysis and SEM modeling.

4.1. Evaluation of the direct effect

The results of the direct effects analysis, estimated using the Jamovi statistical software (version 2.3.28), are reported in the table below. This table summarizes the standardized path coefficients, their levels of statistical significance, and the corresponding inferential statistics, thereby providing a clear overview of the direct relationships specified in the structural model.

Table 5. Estimation of Direct Path Coefficients in the Structural Model

					95% Confidence Intervals				
Label	Dep	Pred	Estimate	SE	Lower	Upper	β	z	p
H1	ATT	PU	0.655	0.0390	0.579	0.732	0.700	16.79	< .001
H2	ATT	PEOU	0.446	0.0358	0.376	0.517	0.448	12.46	< .001
H3	ITU	ATT	0.652	0.0413	0.571	0.733	0.652	15.80	< .001
H4	ITU	TR	0.290	0.0339	0.223	0.356	0.275	8.55	< .001
H5	ITU	SAT	0.374	0.0344	0.306	0.441	0.361	10.87	< .001
H6	CUB	ITU	0.708	0.0422	0.626	0.791	0.882	16.78	< .001

Source: Results obtained via Jamovi (version 2.3.28)

Examination of the structural model parameters shows the following results:

- Perceived usefulness (PU) has a positive and significant influence on the attitude towards use ($\beta = 0.700$, $p < 0.001$).
- Perceived ease of use (PEOU) also has a positive and significant effect on attitude ($\beta = 0.448$, $p < 0.001$).

- ✓ H1 and H2 are therefore confirmed, indicating that the perception of usefulness and ease of use favours the attitude of clients towards the use of ICTs.
- Attitude (ATT) significantly and positively influences the intention to use ($\beta = 0.652$, $p < 0.001$).
- Confidence (TR) also has a positive and significant effect on intention to use ($\beta = 0.275$, $p < 0.001$).
- Satisfaction (SAT) has a positive and significant impact on usage intent ($\beta = 0.361$, $p < 0.001$).
- ✓ These results confirm the H3, H4 and H5 assumptions, highlighting the importance of attitude, trust and satisfaction in strengthening customers' intention to adopt ICTs.
- Intention to use (ITU) exerts a strong and significant influence on effective behavior ($\beta = 0.882$, $p < 0.001$), validating the H6 hypothesis.

4.2. Mediating effects analysis

The following table presents a summary of the parameters estimated in the context of the modelling of mediating indirect effects:

Table 6. Examination of the Indirect Structural Model Parameters

				95% Confidence Intervals				
	Parameter	Estimate	SE	Lower	Upper	β	Z	P
H7	PU $\Rightarrow$ ATT $\Rightarrow$ ITU	0.303	0.025	0.253	0.353	0.402	11.878	< .001
H8	SAT $\Rightarrow$ ITU $\Rightarrow$ CUB	0.206	0.021	0.166	0.247	0.257	10.007	< .001
H9	TR $\Rightarrow$ ITU $\Rightarrow$ CUB	0.462	0.036	0.392	0.532	0.575	13.009	< .001
H10	ATU $\Rightarrow$ ITU $\Rightarrow$ CUB	0.205	0.026	0.155	0.255	0.242	8.012	< .001

Source: Results obtained via Jamovi (version 2.3.28)

The results reported in the table 6 confirm all the proposed mediating hypotheses (H7 to H10). All indirect effects are positive and statistically significant ($p < .001$), indicating a clear and meaningful transmission of effects through the mediating variables examined.

- Perceived usefulness (PU) has a significant indirect effect on the intention to use ICT (ITU) via attitude towards ICT (ATT) (Estimate = 0.303; $\beta = 0.402$; $p < .001$).
- ✓ This result shows that perceived usefulness improves attitude, which in turn reinforces adoption intent. Thus, attitude plays a key mediating role in the cognitive process leading to the acceptance of technology, confirming H7.
- Customer satisfaction (SAT) positively influences effective adoption behavior (CUB) through intent to use (ITU) (Estimate = 0.206; $\beta = 0.257$; $p < .001$). This means that while satisfaction alone does not guarantee adoption, it does strengthen the willingness to use technology, which translates into effective behavior. H8 is therefore confirmed.
- ✓ ICT confidence (TR) has the strongest indirect effect of the model (Estimate = 0.462; $\beta = 0.575$; $p < .001$). This result indicates that trust is a major antecedent of the intention of use and represents

a central lever for transforming this intention into real adoption. H9 is thus clearly confirmed, with a particularly high intensity.

➤ Attitude towards ICT (ATT) significantly influences adoption behavior via intention to use (Estimate = 0.205; $\beta = 0.242$; $p < .001$).

✓ This relationship illustrates the core mechanism of the Technology Acceptance Model (TAM), whereby a favorable attitude toward the technology enhances users' intention to use it, which in turn translates into actual adoption behavior. The significant mediating role of intention to use confirms this sequential process, providing empirical support for the TAM framework. Accordingly, Hypothesis H10 is confirmed.

5. Interpretation and Discussion of Results

I. Technology Acceptance Model (TAM) Extension

This study highlights a positive and significant effect of customers' perceptions and attitudes towards ICT on their adoption behavior. The results of the structural modeling show that :

✧ By incorporating satisfaction and trust into the classical TAM proposed by Davis et al. (1989), this study extends the model beyond its original focus on purely technical characteristics. This enrichment allows the TAM framework to be better adapted to service-based contexts, particularly within the tourism sector, where relational and experiential factors play a crucial role in shaping users' perceptions, intentions, and adoption behavior toward ICT-based services.

✧ Unlike traditional approaches to TAM, which focus mainly on perceived usefulness (PU) and perceived ease of use (PEOU), the proposed model incorporates emotional and relational antecedents that can strengthen and complement the influence of these technological factors on users' intention to adopt the technology.

✧ The empirical findings demonstrate that incorporating satisfaction and trust into the model significantly enhances its explanatory power in predicting customers' intention to adopt ICT-based services in travel agencies. These results highlight the fundamental role of relational and experiential factors, alongside technological perceptions, in shaping customers' adoption intentions within the tourism service context.

✧ Although PU and PEOU remain essential determinants of attitude, they are not enough on their own to guarantee adoption: it is the combination of a satisfactory user experience and a climate of trust that transforms perception into intention of use. This finding is in line with the work of Li & Shan (2023), which highlights the importance of emotional and relational factors in strengthening users' willingness to adopt and continue using digital technologies in tourism contexts.

II. In-depth understanding of ICT adoption behavior

Compared to the existing literature that generally focuses on restricted contexts of use, this study reveals the synergy of the different cognitive and affective dimensions in the development of users' perceptions and behaviors.

Indeed, the results indicate that customers' overall perception of digital tools is based on both perceived usefulness and perceived ease of use, which directly influence attitude towards technology, satisfaction and trust. These factors then condition the intention to use and the actual adoption behavior:

- ***Mediating role of satisfaction in ICT adoption***

Structural analysis confirms that customer satisfaction occupies a significant mediating position between technological perceptions (usefulness, ease of use) and adoption intent. Thus, even if the technology is perceived as effective, it is only when the experience is satisfactory that the user forms a real intention to use.

These results are consistent with prior research demonstrating the role of relational and contextual factors in technology adoption. Specifically, Seow et al. (2024) demonstrate that customer satisfaction plays a critical mediating role in the relationship between users' perceptions of ICTs and their adoption intentions, indicating that positive usage experiences significantly enhance the likelihood of technology acceptance and continued use in service contexts.

- ***Impact of Trust on Adoption Intent***

Trust also showed a positive median effect, illustrating that the adoption of ICT is influenced not only by perceived efficiency but also by individuals' confidence in the reliability and security of the service or platform, which helps reduce perceived risk. This finding aligns with prior research emphasizing the critical role of trust in digital environments characterized by uncertainty and potential risk. For example, Gefen et al. (2003) demonstrated that trust significantly influences users' intention to use online systems by lowering uncertainty and perceived risk in technology-mediated transactions. Such evidence aligns with Manel Kebab's (2025) extension of the TAM, which explicitly integrates trust as a central construct in explaining technology adoption within service sectors. Her study demonstrates that beyond perceived usefulness and perceived ease of use, trust plays a decisive role in shaping users' intentions and sustaining continued adoption, thereby highlighting the importance of relational mechanisms in complementing the traditional cognitive foundations of TAM.

↳ ***Joint contribution of satisfaction and trust: combined mediation***

The findings reveal that the joint effect of satisfaction and trust significantly reinforces the relationship between perceptions derived from the extended Technology Acceptance Model and users' intention to adopt ICTs.

This combined mediating mechanism demonstrates that, beyond the core TAM constructs, the interplay between experiential satisfaction and relational trust is crucial in converting positive technological perceptions into sustained adoption. Consequently, technology adoption decisions in tourism service contexts are driven not only by functional assessments of ICT performance but also by experiential and psychological considerations that shape users' confidence and long-term engagement.

6. CONCLUSION AND MANAGERIAL IMPLICATIONS

This study investigated the role of ICTs in shaping customer adoption behavior within the tourism sector, with specific reference to travel agencies operating in Algeria. Grounded in an extended Technology Acceptance Model (TAM), the research integrated core technological determinants, namely perceived usefulness and perceived ease of use, with relational and experiential mediators, including customer satisfaction and trust. By adopting this comprehensive analytical framework, the study sought to capture both the cognitive and affective mechanisms through which ICT-based services influence user responses.

More specifically, the research aimed to examine how perceptions of ICT performance and usability contribute to the formation of favorable customer attitudes, strengthen intentions to use digital services, and ultimately translate into actual adoption behavior. The findings provide a nuanced understanding of the pathways linking technological perceptions, attitudinal outcomes, and behavioral responses, thereby offering empirical evidence on the determinants of ICT adoption in travel agencies within a developing tourism context.

The results indicate that PU and PEOU exert a significant positive influence on customers' attitudes toward ICTs, which in turn serve as a principal determinant of their intention to use digital services. Satisfaction and trust emerged as central mediating factors, strengthening these intentions and facilitating the conversion of intention into actual adoption behavior. Thus, while the technical characteristics of ICTs remain important, they are not sufficient on their own to ensure effective adoption; rather, it is the positive user experience and relational confidence fostered by travel agencies that enable favorable perceptions to translate into actual customer behaviors.

The findings of this study provide several practical recommendations to travel agencies in Algeria, aimed at fostering ICT adoption and improving customer satisfaction and trust:

- Optimize digital marketing tools: Social networks, websites and online campaigns must clearly communicate the usefulness of ICT services and facilitate their use;
- Invest in user-friendly and reliable digital systems: The adoption of online booking platforms, mobile apps, and intelligent chatbots helps simplify the customer experience and boost satisfaction;
- Strengthen the security and reliability of digital services: Secure payment technologies and trusted data management systems increase customer trust and drive engagement;
- Design innovative and immersive digital experiences: Integrating modern technologies such as virtual reality (VR), augmented reality (AR) or analytics tools to personalize the customer experience helps improve value perception and retention;
- Adopt an integrated technology strategy: Combining digital marketing, booking systems, security, and data analytics into a cohesive approach maximizes ICT adoption and delivers a seamless and satisfying customer experience.

These recommendations show that ICT adoption is not limited to technical functionalities, but is based on a holistic approach that combines technology, user experience, security and strategic communication, drawing on international best practices.

➤ **Research Limitations and Perspectives**

Some limitations must be noted. The study is based on a cross-sectional questionnaire, limiting the observation of long-term behavior.

Future research could include other factors, such as perceived risk, social influence, or quality of service, and adopt longitudinal or mixed approaches to deepen the understanding of the dynamics of ICT adoption in travel agencies in Algeria.

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Appendices

Appendix 1. Constructs, measurement items and literature references

Code	Construct	References
Perceived Usefulness (PU)		
PU1	Using the TAs ICT tools improves my travel planning efficiency.	
PU2	TAs ICT make it easier to access travel information and services.	
PU3	ICT tools enhance the quality of my travel experience.	
PU4	Using the agency's ICT tools is beneficial for me.	
Perceived Ease of Use (PEOU)		
PEOU1	Learning how to use the agency's digital tools is easy for me.	(Guo, Liu, He, & Shuhao, 2025)
PEOU2	The interfaces of the agency's online platforms are user-friendly.	
PEOU3	I can easily perform the tasks I want using these ICT tools.	
PEOU4	I need little help to use the agency's ICT tools effectively.	
Attitude Toward Using ICT (ATU)		(Kebab, 2025)
ATT1	Using the agency's ICT tools is a good idea.	
ATT2	Using digital tools to interact with the agency is enjoyable.	
ATT3	Using ICT tools makes my travel planning more interesting.	
ATT4	ICT tools improve my relationship with the agency.	
Intention to use (ITU)		(Escobar-Rodríguez & Carvajal-Trujillo, 2014)
ITU1	I intend to continue to use the agency's ICT tools in the future.	
ITU2	I will recommend using the agency's digital platforms to others.	
ITU3	I will rely more on ICT for my future travel arrangements.	
Satisfaction (SAT)		
SAT1	I am satisfied with my experience using the agency's ICT tools.	
SAT2	My expectations were met when I used the TAs' online services.	
SAT3	The quality of my interaction with TAs digital platforms is good.	
Trust (TR)		(Kebab, 2025)
TR1	I can trust the agency to keep its promises when using its digital services.	
TR2	TAs are honest and transparent in its online interactions.	
TR3	My personal and financial information is secure with the agency online.	
Customer Use Behavior (CUB)		(Escobar-Rodríguez & Carvajal-Trujillo, 2014)
CUB1	I frequently use ICT tools to interact with the travel agency.	
CUB2	I usually explore travel options online before contacting the agency.	
CUB3	I am actively engaged with TAs through their online and digital channels.	

Appendix 2. Test of Shapiro-Wilk

Variable	Combined Items	W of Shapiro-Wilk *	P - value	Normality	*The W values are approximate and were calculated based on the mean of the items for each variable.
PU	PU1 – PU4	0,868	< 0,001	Non - normal	
PEOU	PEOU1 – PEOU4	0,847	< 0,001	Non - normal	
SAT	SAT1 – SAT3	0,837	< 0,001	Non - normal	
TR	TR1 – TR3	0,867	< 0,001	Non - normal	
ATT	ATT1 – ATT4	0,877	< 0,001	Non - normal	
ITU	ITU1 – ITU3	0,859	< 0,001	Non - normal	
CUB	CUB1 – CUB3	0,860	< 0,001	Non - normal	