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THE INTENTION TO USE MOBILE APPLICATIONS IN TOURISM AMONG GEN Z IN VIETNAM: THE EFFECT OF TECHNOLOGICAL READINESS AND TECHNOLOGY ACCEPTANCE FACTORS

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ABSTRACT

This study aims to investigate the relationship between technological acceptance factors (perceived usefulness, perceived ease of use, trust, and habit) and technological readiness factors (optimism, innovation, resilience, and anxiety) regarding the intention to use mobile applications in tourism (TMAs) among Generation Z in Vietnam. With empirical data gathered from 532 Gen Z respondents using structured questionnaires, the suggested research model was estimated using partial least squares structural equation modeling (PLS-SEM). The findings show that technical preparedness indirectly impacts the desire to use TMAs through the mediating effect of technology acceptability rather than having a direct impact. Perceived utility, perceived ease of use, and habit are favorable characteristics in technological acceptance; however, trust does not have a substantial influence. In order to improve digital tourism applications, make them more useful and simple to use, harmonize and integrate multiple features into one TMA application, and make it easily accessible to Gen Z, this study offers practical implications for tourism authorities, mobile application developers, and tourism businesses. Additionally, unique and distinctive product packages are needed to provide Gen Z with more digital tourism experiences.

Keywords: *Technological readiness, Technology acceptance, Intention to use, Mobile application, Tourism, Gen Z.*

INTRODUCTION

Generation Z, also referred to as iGen or Gen Z, is a demographic cohort that falls between the Millennial (Generation Y) and Generation Alpha, born between the early 1990s to the early 2010s (Haddouche & Salomone, 2018). Growing up in a world of the internet, digital devices, electronics, Industry 4.0, and multi-dimensional access to the world post-Cold War, Generation Z is recognized as tech-savvy individuals who habitually use technology in every aspect of their daily lives (Francis & Hoefel, 2018; Haddouche & Salomone, 2018).

Francis and Hoefel (2018) suggest that iGen is a generation of new influencers as they frequently create new trends in behavior and experiential activities. The rise of information technology and communication in the era of smart tourism has transformed how businesses and tourism organizations communicate and manage tourists. Specifically, mobile-connected applications have changed the way tourist products are chosen, connected, and co-created (Hughes &

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Moscardo, 2019). The new ICT era has created a variety of new tools for the tourist sector, including management, marketing, and business tools, according to Dorcic *et al.* (2019).

In today's world, mobile phones and smart connected devices are essential tools in both personal and professional activities, as highlighted by Wang *et al.* (2014), and Wang and Fesenmaier (2013). In the tourism industry, the development of technology has revolutionized the service industry, transforming every aspect of both tourism supply and demand, particularly in light of the COVID-19 pandemic and the trend toward contactless consumption. As Boes *et al.* (2015) suggests, mobile phones, in particular, have become the primary means of accessing information, and mobile applications (Apps) have become a key area of focus for the tourism industry.

Buhalis and Law (2008) suggest that this shift towards mobile technology has transformed how hotel and tourism marketers interact with their target markets, while Wang *et al.* (2012) point out that tourists now receive information about their destinations through mobile devices such as smartphones and tablets. According to the OECD organization (2018, p. 87), technology has continuously reshaped the tourism value chain, and this trend is expected to continue, with many new trends in tourism supply and demand.

According to Morosan and DeFranco (2016) and Wang and Fesenmaier (2013), the emergence of mobile applications has been a key driver in this shift, giving visitors useful platforms throughout their travels. Through scientific sharing, comments, and ideas, these applications let visitors look for information, compare costs and services, book services, check user reviews, and even co-create value for travel-related items. Future travelers will have access to multidimensional information with greater quality and more possibilities, as suggested by Yeoman (2008). With the use of technologies like the internet, video on demand, and online tourist service booking via mobile applications, they will be able to buy tailored holidays. In the years leading up to 2050, Scott and Gössling (2015) forecast that mobile devices and social media reservation systems and marketing will continue to develop and expand, fostering product and service transparency, expanding markets through the sharing economy, and satisfying the travel preferences of emerging markets like Generation Z and Generation Alpha.

The tourism service industry has witnessed significant advancements in technology and digitalization trends, leading to the development of numerous mobile applications that businesses, destinations, and government agencies strive to invest in to enhance service quality management, revenue optimization, and a better understanding of tourists. Moreover, touchless tourism, digitalization trends, and the sharing economy have further cemented the importance of mobile applications for tourists in the future. However, as technology is constantly evolving, and tourists' needs depend on various macro-environmental factors, including psychological characteristics and context, it is crucial to comprehend the behaviors of tourists and understand consumer trends and factors influencing Generation Z's intention to use Tourism Mobile Applications (TMAs). This understanding is essential for destinations and tourism businesses to develop suitable management strategies, products, and services to attract tourists and build a competitive edge. The present study combined two models, Technology Readiness (TR) and Technology Acceptance (TAM), to answer the following questions:

- Which factors influence the adoption and acceptance of TMAs by Generation Z in Vietnam?

- Is there a correlation between the readiness and acceptance of using TMAs by Generation Z in Vietnam?
- What is the current level of adoption and acceptance of TMAs by Generation Z in Vietnam?

The remainder of this study is organized as follows: Firstly, a comprehensive literature review and the development of hypotheses are presented. Secondly, the methodology, including measures and samples, is described. Thirdly, the results of the study are reported. Finally, a discussion on the implications and contributions of the research findings is presented before indicating potential avenues for future research.

Literature Review and Hypotheses Development

The Influence of Technology Readiness on the Intention to Use TMAs of Gen Z.

Individuals with high positive technology readiness (TR) and low negative technology readiness are more inclined to use technology than other people, according to Parasuraman (2000a). Consumers with high TR are more likely to buy things online than those with normal or lower TR, according to a separate study by Parasuraman and Colby (2015). Chau (2019) discovered that TR had a favorable impact on research on student acceptability and propensity to use mobile video in online learning. As a result, TR is essential to the usage of technology and services (Liljander *et al.*, 2006; Lin & Chang, 2011), having a significant influence on customer happiness and desire to utilize a certain technology.

According to Liljander *et al.* (2006), a closer look at the various components of TR indicates that only optimism and innovation have a substantial influence on the desire to utilize technology. On the other side, Lin and Hsieh (2006) showed that while negative TR has a significantly detrimental influence on technological acceptability, good TR has a significantly favorable impact on it. According to studies by Lin *et al.* (2007), Dadvari and Do (2019), and Jin (2020), optimism and innovativeness (positive motivators of technological readiness) are closely related to how easy and helpful a specific technology is regarded as being to use. The perceived usability of a technology is inversely correlated with discomfort and insecurity. In instance, optimists frequently have a laid-back mindset and are less likely to be concerned about the drawbacks or limits of technology (Walczuch *et al.*, 2007; Kuo *et al.*, 2013). Many researchs found that individuals with a proclivity for innovation are less concerned about whether new technologies are easy to use or not; instead, they still intend to use them despite the difficulties or obstacles they may encounter. Ward *et al.* (2007) demonstrated that innovativeness has a positive impact on the level of ability to use technology, while Meyer (2008) concluded that work environments with many young, creative, and innovative people are also environments with more new technology users. Conversely, Godoe and Johansen (2012) found that although innovators feel that using new technology is easy, they do not find technology very useful.

Research on discomfort has produced varying outcomes. Adiyarta *et al.* (2018) demonstrated that discomfort does not affect perceived ease of use, contrary to the findings of Walczuch *et al.* (2007), who concluded that discomfort negatively affects the perceived ease of use of technology. According to Adiyarta *et al.*'s explanation of this finding, some people may not be overwhelmed by new technology and may not anticipate its appearance. Contrarily, anxiety is characterized by a lack of faith in technology and doubt over its capacity to perform as intended

(Parasuraman, 2000; Kuo *et al.*, 2013). Anxious people frequently worry about the security of their gadgets and the protection of their personal data (Liang *et al.*, 2022). The perceived utility and usability of new technology have been shown to suffer when people are anxious (Walczuch *et al.*, 2007; Adiyarta *et al.*, 2018). On the basis of the aforementioned considerations, we thus suggest the following hypothesis:

- H_1: Optimism has a positive effect on the intention to use TMAs among Generation Z.
- H_2: Innovation has a positive effect on the intention to use TMAs among Generation Z.
- H_3: Discomfort has a negative effect on the intention to use TMAs among Generation Z.
- H_4: Anxiety has a negative effect on the intention to use TMAs among Generation Z.

The Influence of Technology Acceptance on Gen Z's Intention to Use TMAs

Perceived usefulness (PU) and perceived ease of use (PEOU), both of which represent customers' views of advantages, are related in the Technology Acceptance Model (TAM), with PEU acting as the determinant for POU. The study of Davis *et al.* (1989), along with that of several others, supports the idea that POU and PEU have an impact on customers' intentions to adopt technology. According to Lin and Chang (2011), a client is more likely to utilize self-service technology if they believe it to be easy to use and beneficial. According to Lee's (2012) research, customers are more likely to utilize mobile applications if they believe they would be more beneficial. According to research by Oh *et al.* (2014), POU, PEU, and pleasure (perceived enjoyment) have a significant impact on customers' intentions to utilize Internet services. Consumers are more inclined to utilize technology that they believe will be beneficial in their daily lives, according to research by Alalwan *et al.* (2017). According to Dadvari and Do (2019), POU has a direct impact on Gen Z customers' intentions to utilize technology-mediated communication platforms. Similar results have been reported by different researchers in the context of wearable technology applications for sports, healthcare tourism apps (Chang *et al.*, 2015), destination-based tourism apps (Kamboj & Joshi, 2021), online shopping and payment apps (Boes *et al.*, 2015; Morosan & DeFranco, 2016; Gupta & Arora, 2020). By using the mediating function of attitudes toward applications, Bui Thanh Khoa *et al.* (2020) showed that perceived usefulness and ease of use have a direct impact on the intention of the young generation in Vietnam to use mobile applications to choose tourism services during the period of innovation.

Recent studies have shown that habitual behaviors quickly emerge in response to activating cues without supervision, including perceptions of ease of use and usefulness (Neal *et al.*, 2011). According to Kamboj and Joshi (2021), a key factor in determining a smartphone user's inclination to use an application and how loyal they are to travel-related applications is their habit of utilizing technological applications. Additionally, trust is an important consideration when determining the desire to use smartphone apps for travelers (Gupta *et al.*, 2018), social media platforms, shopping on mobile devices and compensation (Gupta & Arora, 2020) and banking mobile services and applications (Alalwan *et al.*, 2017; Jabbar *et al.*, 2021). Trust also affects the intention to purchase online (Vieira *et al.*, 2020) and is specific to individual technology trust. Therefore, based on the above arguments, the following hypotheses regarding the influence of technology acceptance on the intention to use technology-mediated applications (TMAs) among Generation Z in Vietnam can be proposed.

- H_5: Perceived usefulness positively impacts the intention to use TMAs among Generation Z.

- H_6: Perceived ease of use positively impacts the intention to use TMAs among Generation Z.
- H_7: Trust positively impacts the intention to use TMAs among Generation Z.
- H_8: Habit positively impacts the intention to use TMAs among Generation Z.

The Perceived Usefulness (PU) and Perceived Ease of Use (PEU) link is highlighted by the Technology Acceptance Model (TAM), where PEU is dominated by PU. This suggests that when technology is simple to use on a regular basis, people prefer to regard it as beneficial. Dadvari and Do's (2019) research indicates that individual characteristics, as well as external factors such as social influence, can influence these two factors. Moreover, previous studies have examined how personality traits and beliefs toward technology affect the intention to continue using new technology such as Facebook, Twitter, etc. In this context, the authors of this study evaluated Technology Readiness as a prerequisite for both PU and PEU in modern social media systems, where PEU has both direct and indirect impacts through PU and users' attitudes towards popular social media systems. Therefore, the mediating role of TAM was evaluated to examine the relationship between TR and the intention to use Technology Mediated Applications (TMAs). The mediating function of TAM factors in social media use has been noted in earlier research by Burton-Jones and Hubona (2006). Additionally, TAM factors have an intermediary role in the interaction between TR variables and the desire to utilize self-service technology, which impacts the decision-making process to use technology applications, according to Lin and Chang (2011). People who are optimistic, love novelty and inventiveness, and have a high degree of technology acceptance are more inclined to employ higher technology. PEU's partly mediating function in the association between POU and compatibility with utilizing the Alipay e-wallet was validated by Lui *et al.* in 2021. The study by Iqbal *et al.* (2018) also confirmed the partial mediating role of online trust, POU, and intention to shop online via mobile devices. Liang *et al.* (2022) acknowledged that POU plays an intermediary role between TR factors and the intention to purchase products through M-shopping applications. Additionally, some studies found a positive correlation between TR characteristics, trust, and habits, suggesting that TR personality traits can lead to trust and habits in using Internet services and self-service technology applications (Lin & Hsieh, 2006; Godoe & Johansen, 2012).

The correlation between age, habits, readiness, and technology acceptance has garnered significant attention from various scholars (Burton-Jones & Hubona, 2006). Research suggests that older individuals tend to be more conservative and subjective, which makes it challenging for them to adopt new technologies compared to younger individuals. However, an individual's living and working environment, along with positive personality traits and a creative lifestyle, can influence their inclination towards new technologies. According to Morris and Venkatesh's (2000) study, younger people with frequent technology usage habits, inquisitive personalities, and a flair for creativity are more likely to accept and use new technologies than older people who are less adaptable and insecure about utilizing them. Moreover, if an application is both useful and easy to use, it may appeal to a broader range of individuals, particularly in a work setting (Meyer, 2008; Liang *et al.*, 2022a). Numerous other studies have also demonstrated a positive correlation between individuals with positive attitudes toward innovation and technology use and their likelihood to adopt new technologies (Lin & Hsieh, 2006; Lin *et al.*, 2007; Chang *et al.*, 2015; Nguyen, 2020). For instance, Pham and Ho (2015) investigated the

relationship between individual innovation and their intention to use mobile payment applications and found that those who are early adopters of innovation are more willing to learn and use mobile online payment services. These individuals tend to have high curiosity and explore and seek information on new applications. Similarly, a study by Lui and colleagues (2021) suggests that individuals with high creativity and innovation are more likely to have positive perceptions and intentions toward new technology, find these applications useful and easy to use, and have no difficulty adapting to new technology.

The variables of PEU and POU are indicative of the consistent behavior of individuals in using technology. When individuals find technology easy to use, they are more likely to accept and use it. If they find technology easy to use and useful, they will have confidence that it will be truly beneficial. The greater the ease of use of technology, the more useful it is perceived to be. Furthermore, individuals who possess a habit of using technology, combined with optimistic and innovative traits, are more likely to have the intention to use technology (Wahyuni *et al.*, 2021). Based on these findings, the study proposes the following hypotheses:

- H_{9a}: Perceived usefulness mediates the relationship between optimism and intention to use TMA among Generation
- Z. H_{9b}: Perceived ease of use mediates the relationship between optimism and intention to use TMAs among Generation Z.
- H_{9c}: Trust mediates the relationship between optimism and intention to use TMAs among Generation Z.
- H_{9d}: Habit mediates the relationship between optimism and intention to use TMAs among Generation Z.
- H_{10a}: Perceived usefulness mediates the relationship between innovation and intention to use TMAs among Generation Z.
- H_{10b}: Perceived ease of use mediates the relationship between innovation and intention to use TMAs among Generation Z.
- H_{10c}: Trust mediates the relationship between innovation and intention to use TMAs among Generation Z.
- H_{10d}: Habit mediates the relationship between innovation and intention to use TMAs among Generation Z.
- H_{11a}: Perceived usefulness mediates the relationship between discomfort and intention to use TMAs among Generation Z.
- H_{11b}: Perceived ease of use mediates the relationship between discomfort and intention to use TMAs among Generation Z.
- H_{11c}: Trust mediates the relationship between discomfort and intention to use TMAs among Generation Z.
- H_{11d}: Habit mediates the relationship between discomfort and intention to use TMAs among Generation Z.
- H_{12a}: Perceived usefulness mediates the relationship between anxiety and intention to use TMAs among Generation Z.
- H_{12b}: Perceived ease of use mediates the relationship between anxiety and intention to use TMAs among Generation Z.

- H_{12c}: Trust mediates the relationship between anxiety and intention to use TMAs among Generation Z.
- H_{12d}: Habit mediates the relationship between anxiety and intention to use TMAs among Generation Z.

The relationship between technological acceptance factors (perceived usefulness, perceived ease of use, trust, and habit) and technological readiness factors (optimism, innovation, resilience, and anxiety) regarding the intention to use mobile applications in tourism (TMAs) among Generation Z in Vietnam is showed in the **Figure 1**:

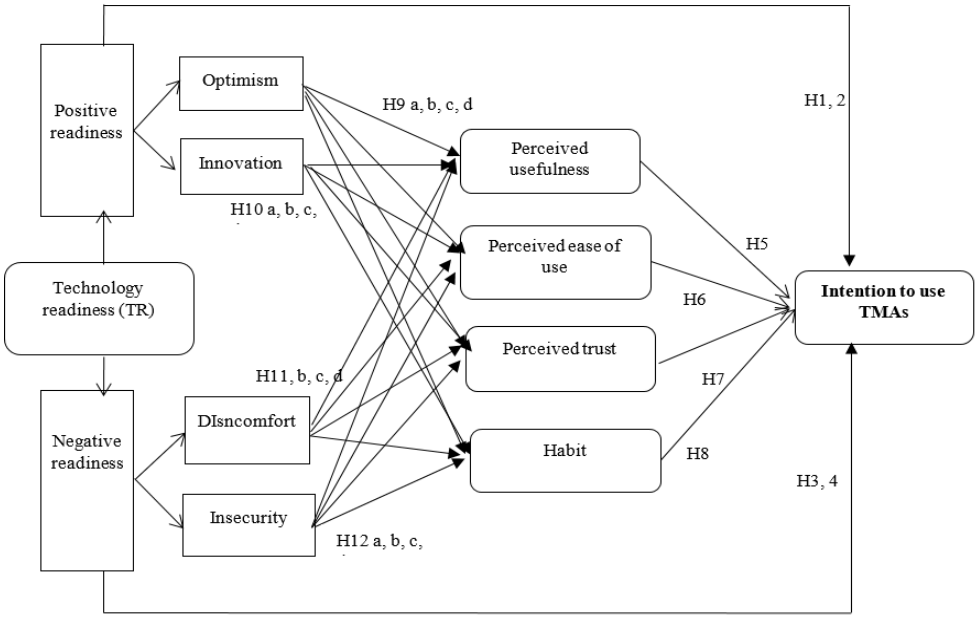

Figure 1. Conceptual framework

MATERIALS AND METHODS

Research Process

To address the major themes of the research material, the study uses an interdisciplinary method that relies on tourism, sociology, psychology, economics, business administration, and marketing. The primary research methods utilized are quantitative analysis, content analysis, group interviews, expert interviews, and survey investigation. To test research ideas, the Structural Equation Modeling (SEM) approach is also used.

During Phase 1, the study utilized exploratory research to propose scientific viewpoints without relying on statistical tools. To gather relevant data, the study relied mainly on secondary data sources from reputable scientific journals in Vietnam and globally. Bibliometric and content analysis methods were employed to synthesize literature on topics related to the research and identify gaps in existing research. Additionally, group and expert interview methods were used to refine the study's model, scales, and observed variables.

The study used quantitative research using survey methodologies in Phase 2. Using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique and the SmartPLS 3.3

software, pilot and formal surveys were conducted to validate the measurement and structural models.

Measurement

All measurements in this study were based on prior relevant studies and were rated on a five-point Likert scale, with 1 being the strongest disagreement and 5 being the strongest agreement. In the context of online surveys, variables will be assessed on a 5-level scale to prevent confusion for respondents, even though theoretically, smaller and more comprehensive scales give more accuracy.

- *Optimism*: includes six variables (OPT1 to OPT6) inherited from the scales used in the studies of Compernolle *et al.* (2018), Namho Chung *et al.* (2015), and Jin (2020).
- *Innovation*: includes five variables (INO1 to INO5) inherited from the scales used in the studies of Compernolle *et al.* (2018) and Namho Chung *et al.* (2015).
- *Discomfort*: includes seven variables (DIC1 to DIC7) inherited from the scales used in the studies of Compernolle *et al.* (2018), Jin (2020), and two additional variables developed and supplemented from in-depth interview results.
- *Insecurity*: includes five variables (INS1 to INS5) inherited from the scales used in the studies of Compernolle *et al.* (2018) and Oh *et al.* (2014).
- *Perceived usefulness*: includes five variables (POU1 to POU5) inherited from the scales used in the studies of Compernolle *et al.* (2018) and Jin (2020).
- *Perceived ease of use*: includes five variables (PEU1 to PEU5) inherited from the scales used in the studies of Compernolle *et al.* (2018), Chung *et al.* (2015), and Jin (2020).
- *Perceived trust*: includes four variables (PTR1 to PTR4) inherited from the scales used in the study of Alalwan *et al.* (2017a).
- *Habit*: includes four variables (HAB1 to HAB4) inherited from the scales used in the studies of Lin *et al.* (2007), Chung *et al.* (2015), Alalwan *et al.* (2017), and supplemented from in-depth interview results.
- *Intention*: includes four variables (INT1 to INT4) inherited from the scales used in the studies of Lin *et al.* (2007), Chung *et al.* (2015); Alalwan *et al.* (2017); Buhaliqah *et al.*, (2021), and supplemented from in-depth interview results by the authors.

Sample

The target population for the study was identified as Generation Z living and working throughout Vietnam, between the ages of 15 and 25, with 15-17 being high school students, 18-21 being vocational, college, and university students, and 22-25 being graduates who have started working or are pursuing higher education. The reason for selecting individuals aged 15 and above is that at this age, people are considered to have attained a certain level of maturity and are capable of independent thinking, perspectives, and lifestyles.

A pilot test with 185 participants was conducted before the main survey to validate the questions. Three items with outside loadings < 0.5 were updated after the pilot test by adding further information. Between October and December 2021, the formal survey was done, and before respondents filled out the questionnaires, they were given information about the study's goals and the concept of social enterprises. With the lecturers' permission, questionnaires were

distributed both online and offline. After missing data was removed and all scores were standardized, 39 qualifying samples were kept for additional research.

According to Hair *et al.* (2011), n = 5m, where m is the number of observed variables equal to the number of research questions, is the minimum sample size needed for exploratory factor analysis (EFA), and the sample size should not be less than 100. The minimal sample size required for this investigation under these criteria is 195. Hair *et al.* (2017) contend, however, that for PLS-SEM analysis, a sample size of at least 200 observations is usually adequate. A larger sample size increases reliability in a quantitative study with many high-level variables. To ensure the reliability of regression and statistical analysis, and meet the requirements of the minimum sample size, 554 responses were collected in this study. After data cleaning and removing responses that did not meet the requirements, the final sample size was 532, yielding a response rate of 96.02%.

Among the 532 valid responses (325 from online surveys, accounting for 61.0%, and 207 from hardcopy responses), 36.8% were males and 57.7% were females. The sample included 94 high school students aged 15-17, accounting for 17.7%. Over 50% of the respondents were aged 18-22 and currently studying in vocational schools/colleges, universities, working as laborers or self-employed workers. The remaining 157 individuals (29.5%) aged 23-25 were those who had started working in business, civil service, government officials (public sector), office staff (private sector), self-employed workers, and laborers. In terms of educational qualifications, 73.2% were high school and university students, while the remaining 24.6% had a high school education or lower. Only 2.2% had a postgraduate degree. Regarding income and travel expenses, 39.1% of respondents reported being dependent with no income and usually received support from family members, savings from part-time jobs, or money from scholarships to travel. 18.4% had started earning income from part-time jobs. 23.3% used their entire salary to travel.

Data Analysis

Partial Least Squares-Structural Equation Modeling (PLS-SEM) using SmartPLS 3.3 was used to evaluate the data in this study. This approach has also been used in earlier studies to investigate the goal of mobile applications, such as those by Lui *et al.* (2021) and Iqbal *et al.* (2018). The PLS-SEM analysis procedure described by Hair *et al.* (2019), which consists of two main phases, was used: (1) evaluating the measurement model and (2) estimating the model and testing hypotheses. During the first step, the validity and reliability of the research constructs were assessed, and checks for common method bias and multicollinearity were conducted. In the second step, model estimation, and hypotheses were tested using the bootstrapping procedure with 5000 resamples to obtain values for R2 (explained variance), f2 (effect sizes), Q2 (predictive power of the model), path coefficients, t-values, and p-values.

RESULTS AND DISCUSSION

Empirical Results

Measurement Model Assessment

The measurement model was used to evaluate the validity and reliability of the investigated constructs. Cronbach's alpha and composite reliability (CR), which measure dependability, were

determined, and their respective values ranged from 0.936 to 0.970 and 0.910 to 0.961 **(Table 1)**. These numbers are higher than the advised cutoff point of 0.7 (Hair *et al.*, 2019).

The average variance extracted (AVE) values were analyzed to determine convergent validity. The findings revealed AVE values for the constructs that ranged from 0.696 to 0.877, beyond the threshold of 0.5 (Hair *et al.*, 2019), demonstrating the convergent validity of the constructs. The Fornell-Larcker criteria, which compare the square root of the AVE to the correlations between constructs, were used to test discriminant validity. The outcomes shown in **Table 1** demonstrated the discriminant validity of the variables by meeting this requirement. Additionally, the hetero-trait-monotrait ratio (HTMT) and the cross-loading criteria were evaluated and provided consistent results (Hair *et al.*, 2019).

Table 1. The measurement model assessment result

Factor	Cronbach's Alpha	CR	AVE	1	2	3	4	5	6	7	8	9
1. Perceived trust	0.953	0.966	0.877	**0.937**								
2. Insecurity	0.917	0.938	0.751	-0.318	**0.867**							
3. Discomfort	0.927	0.941	0.696	-0.314	0.747	**0.834**						
4. Optimism	0.948	0.959	0.795	0.639	-0.255	-0.275	**0.892**					
5. Innovation	0.920	0.940	0.759	0.678	-0.319	-0.350	0.684	**0.871**				
6. Habit	0.910	0.936	0.786	0.758	-0.413	-0.412	0.538	0.653	**0.887**			
7. Perceived ease of use	0.937	0.952	0.801	0.756	-0.401	-0.434	0.664	0.637	0.624	**0.895**		
8. Perceived usefulness	0.961	0.970	0.865	0.819	-0.355	-0.397	0.728	0.650	0.671	0.851	**0.930**	
9. Intention to use TMAs	0.942	0.958	0.851	0.755	-0.354	-0.376	0.657	0.647	0.715	0.758	0.810	**0.923**

Structural Model Assessment

Direct effects: Following the strategy suggested by Henseler *et al.* (2009), this study used the bootstrapping methodology in SmartPLS with a repeated sample of 5,000 from the original 532 instances to evaluate the research hypotheses. **Table 3** provides a detailed presentation of the outcomes of the hypothesis test.

With threshold indices like a P-value less than 0.05 and a t-value greater than 1.96 (Hair *et al.*, 2011), the results in **Table 2** show that the relationships between perceived usefulness, perceived ease of use, and habit (corresponding to H5, H6, and H8) and the intention to use TMAs are all supported. Thus, among Generation Z in Vietnam, habit, perceived utility, and perceived simplicity of use are important characteristics that favorably affect the propensity to use TMAs. Among these factors, perceived usefulness has the greatest impact, with an effective coefficient of 0.16 and T-values of 2.647, 4.679, and 4.760, which are statistically significant.

Table 2. Results of hypothesis testing - Direct relationships

Hypotheses	Relationship	Coefficient	T-test	P-Value	Decision
H_1	*Optimism -> Intention to use TMAs*	*0.076*	*1.510*	*0.131*	*Rejected*
H_2	*Innovation -> Intention to use TMAs*	*0.050*	*1.108*	*0.268*	*Rejected*
H_3	*Discomfort -> Intention to use TMAs*	*0.001*	*0.014*	*0.989*	*Rejected*
H_4	*Insecurity -> Intention to use TMAs*	*-0.002*	*0.051*	*0.959*	*Rejected*
H_5	Perceived usefulness-> *Intention to use TMAs*	0.370	4.679	0.000	*Accepted*
H_6	Perceived ease of use-> *Intention to use TMAs*	0.161	2.647	0.008	*Accepted*
H_7	*Perceived trust-> Intention to use TMAs*	*0.060*	*0.882*	*0.378*	*Rejected*
H_8	Habit -> *Intention to use TMAs*	0.247	4.760	0.000	*Accepted*

The results above reveal that none of the direct effects met the standards and required mediation. In essence, the personal traits of Generation Z, be they positive or negative, do not have a direct impact on the intention to use TMAs, but rather need to be mediated by intermediary factors such as habit, POU, and PEU of Generation Z towards TMAs **(Table 2)**.

Indirect effects: The direct and indirect associations must be tested simultaneously in order to evaluate the indirect effect, also referred to as the mediating effect. The direct correlation between TR factors and the intention to use TMAs as well as the indirect correlation between TAM factors and the intention to use TMAs must be measured in the proposed research model in order to assess the mediating effect of TAM variables (perceived ease of use, perceived usefulness, habit, and trust) on the relationship between TR and the intention to use TMAs. **Table 3** has this evaluation.

Table 3. Results of structural equation model estimation

Hypotheses	Factors	Effects	Coefficient	t-value (>1.96)	p-value (<0.05)	Results	Conclusion
H_{9a}	*Optimism -> Intention to use TMAs*	*Direct*	*0.076*	*1.510*	*0.131*	*No*	

	Optimism -> Perceived ease of use -> *Intention to use TMAs*	Indirect	0.066	2.472	0.013	Yes	Indirect mediator
H_{9b}	Optimism -> *Intention to use TMAs*	*Direct*	*0.076*	*1.510*	*0.131*	*No*	Indirect mediator
	Optimism -> Perceived usefulness -> *Intention to use TMAs*	Indirect	0.192	4.287	0.000	Yes	
H_{9c}	Optimism -> *Intention to use TMAs*	*Direct*	*0.076*	*1.510*	*0.131*	*No*	*Rejected*
	Optimism -> *Perceived trust -> Intention to use TMAs*	Indirect	*0.019*	*0.866*	*0.387*	*No*	
H_{9d}	Optimism -> *Intention to use TMAs*	*Direct*	*0.076*	*1.510*	*0.131*	*No*	Indirect mediator
	Optimism -> Habit -> *Intention to use TMAs*	Indirect	0.038	2.608	0.009	Yes	
H_{10a}	Innovation -> *Intention to use TMAs*	*Direct*	*0.050*	*1.108*	*0.268*	*No*	Indirect mediator
	Innovation -> Perceived ease of use -> *Intention to use TMAs*	Indirect	0.044	2.232	0.026	Yes	
H_{10b}	Innovation -> *Intention to use TMAs*	*Direct*	*0.050*	*1.108*	*0.268*	*No*	Indirect mediator
	Innovation -> Perceived usefulness -> *Intention to use TMAs*	Indirect	0.086	3.244	0.001	Yes	
H_{10c}	Innovation -> *Intention to use TMAs*	*Direct*	*0.050*	*1.108*	*0.268*	*No*	*Rejected*
	Innovation -> *Perceived trust -> Intention to use TMAs*	Indirect	*0.026*	*0.866*	*0.386*	*No*	
H_{10d}	Innovation -> *Intention to use TMAs*	*Direct*	*0.050*	*1.108*	*0.268*	*No*	Indirect mediator
	Innovation -> *Habit -> Intention to use TMAs*	Indirect	0.115	3.943	0.000	Yes	
H_{11a}	*Discomfort -> Intention to use TMAs*	*Direct*	*0.001*	*0.014*	*0.989*	*No*	*Rejected*
	Discomfort -> Perceived ease of use -> *Intention to use TMAs*	Indirect	*-0.025*	*1.939*	*0.053*	*No*	
H_{11b}	*Discomfort -> Intention to use TMAs*	*Direct*	*0.001*	*0.014*	*0.989*	*No*	Indirect mediator
	Discomfort -> Perceived usefulness -> *Intention to use TMAs*	Indirect	-0.052	2.077	0.038	Yes	
H_{11c}	*Discomfort -> Intention to use TMAs*	*Direct*	*0.001*	*0.014*	*0.989*	*No*	*Rejected*
	Discomfort -> Perceived trust -> Intention to use TMAs	Indirect	*0.000*	*0.054*	*0.957*	*No*	
H_{11d}	*Discomfort -> Intention to use TMAs*	*Direct*	*0.001*	*0.014*	*0.989*	*No*	*Rejected*
	Discomfort -> Habit -> Intention to use TMAs	Indirect	*-0.022*	*1.482*	*0.138*	*No*	
H_{12a}	*Insecurity -> Intention to use TMAs*	*Direct*	*-0.002*	*0.051*	*0.959*	*No*	*Rejected*
	Insecurity -> Perceived ease of use -> *Intention to use TMAs*	Indirect	*-0.015*	*1.319*	*0.187*	*No*	
H_{12b}	*Insecurity -> Intention to use TMAs*	*Direct*	*-0.002*	*0.051*	*0.959*	*No*	*Rejected*
	Insecurity -> Perceived usefulness -> *Intention to use TMAs*	Indirect	*-0.016*	*0.881*	*0.378*	*No*	
H_{12c}	*Insecurity -> Intention to use TMAs*	*Direct*	*-0.002*	*0.051*	*0.959*	*No*	*Rejected*

	Insecurity -> Perceived trust -> Intention to use TMAs	Indirect	*-0.006*	*0.719*	*0.472*	*No*	
H_{12d}	*Insecurity -> Intention to use TMAs*	*Direct*	*-0.002*	*0.051*	*0.959*	*No*	Indirect mediator
	Insecurity -> Habit -> *Intention to use TMAs*	Indirect	-0.039	2.310	0.021	Yes	

The study's findings show that both positive and negative preparedness had no discernible impact on people's intentions to use TMAs. However, habit, perceived utility, and perceived ease of use all have an indirect impact.

The outcomes of the structural model estimation are displayed in **Table 3**. The relationships between perceived positive readiness (optimism, innovation), perceived negative readiness (discomfort, insecurity), and TMA's intention were examined using hypotheses 9a, 10a, 11a, and 12a. The association between optimism, innovation, and TMAs' intention was positively significant at β= 0.066 (t = 2.472, p = 0.013) and β= 0.04 (t = 2.232, p = 0.026), as shown in **Table 2**. The 9a and 10a hypotheses were therefore verified. Through the mediating function of PEU, the link between discomfort, anxiety, and desire to use TMAs among Generation Z was not statistically significant at β= -0.025, -0.015, (t = 1.939, p = 0.053), and (t = 1.319, p =0.187). 11a and 12a hypotheses weren't supported.

Similar to Hypotheses 9a, 9b, 10a, 11a, and 12a, these hypotheses evaluated the mediating function of POU in the link between positive readiness (optimism, innovation), negative readiness (discomfort, insecurity), and TMA's intention. **Table 2** demonstrates that, through the mediating function of POU, the association between optimism, innovation, discomfort, and TMA's intention was significant with β= 0.192, 0.086, and -0.052 (p = 0.000, 0.001, and 0.038). However, among Generation Z, the mediating effect of POU on the link between anxiety and the desire to use TMAs was inconsequential.

The mediating function of trust in the link between positive and negative readiness and intention to use TMAs among Generation Z was evaluated by hypotheses 9c, 10c, 11c, and 12c. None of the four ideas were confirmed.

The mediating effect of anxiety on the link between positive and negative readiness and intention to use TMAs among Generation Z was examined by hypotheses 9d, 10d, 11d, and 12d. The link between positive preparedness (optimism, innovation) and TMA's intention was significantly correlated with β= 0.038 (t = 2.608; p = 0.009) and β= 0.115 (t = 3.943, p = 0.000), respectively, according to **Table 3**. As a result, hypotheses 9d and 10d were verified. According to **Table 2**, the connection between TMA's intention and negative readiness (discomfort and insecurity) was not statistically significant at β= -0.022 (t = 1.482, p = 0.138) and β= -0.039 (t = 2.310, p = 0.021). Hypotheses 11d and 12d were not supported as a result.

Discussion

Main Findings

The Technology Readiness Acceptance Model (TRAM) has been used in the study to demonstrate a link between the postulated personality qualities in TR (optimism, innovativeness, anxiety, and discomfort) and the core components of TAM (perceived ease of use, perceived usefulness, trust, and habit). The research's findings support the theories drawn from the research model and other investigations. The study shows that a few TR and TAM characteristics are very important

in determining whether or not people intend to utilize TMAs. Furthermore, the intention to continue using an application is influenced by POU and PEU. It is worth noting that not all aspects of TR personality traits impact technology acceptance and usage. Optimism and innovativeness are significant personality traits that affect the POU and PEU of TMAs. An individual with a positive outlook towards technology, in general, is more likely to perceive TAM as more useful and easier to use than someone who lacks optimism. This is especially true for Gen Z in Vietnam and is further pronounced among those with innovative and creative traits.

Additionally, the study suggests that positive technology readiness positively impacts perceived usefulness and ease of use. Users who tend to embrace new technology are more likely to evaluate the ease and usefulness of TMAs. Conversely, a negative technology readiness harms the perception of the usefulness of TMAs. These results reinforce the findings of Jin's (2020) prior study on predicting the intention to use applications of brand users.

The results of the study show a substantial correlation between TR, TAM, and the desire to utilize TMAs. In particular, only individuals who have "perceived ease of use," "perceived usefulness," and "habit" among the four TAM characteristics display such intention, but TR qualities of Gen Z do not impact this intention. This outcome is consistent with the earlier research by Godoe and Johansen (2012). The innovation (of TR) was discovered to favorably affect the degree and intention to utilize technology, according to Jin (2020), Adiharta *et al.* (2018), Wahyuni *et al.* (2020), and Chau (2019); however, this contradicts their findings. Furthermore, according to Jin (2020), if individuals share the same perceptions of ease of use and usefulness, this completely overrides the influence of TR factors on the intention to trust and use a mobile application.

Anxiety and discomfort have minimal impact on the cognitive aspects of TAM. Except for the relationship between discomfort and POU, this suggests that if a technology is truly useful, Gen Z individuals with these traits will still accept its use despite their initial negative feelings. The direct impact of ease of use on actual utilization is seen by the positive connection between POU and PEU. In conclusion, TMA adoption is highly influenced by TAM features, their impact on actual use, and perceived utility. These results concur with the majority of earlier TAM investigations (Morosan & Dfranco, 2016).

Theoretical and Practical Implications

This study represents a pioneering effort to analyze the characteristics and mobile application usage trends among Gen Z tourists in Vietnam. The research expanded the TRAM model to evaluate the readiness and acceptance of Gen Z tourists in Vietnam towards using mobile applications. The combination of the two models to create the TRAM model represents a novel approach that is not yet prevalent in the tourism industry. Moreover, the study introduced two new factors, "Trust" and "Habit of using technology," to further elucidate the personality traits of Gen Z in Vietnam as a generation of explorers with a penchant for creativity. From a practical standpoint, the study proposes managerial implications for state tourism management agencies, tourist destinations, and tourism businesses, thereby contributing to advancing Vietnam's tourism industry towards a comprehensive "smart" tourism environment that caters to the needs of potential customers, such as Gen Z.

Managerial Implication

The current study confirmed the existence of links between perceived enjoyment, perceived utility, habit, and trust and the features of technology readiness by examining major components of user acceptance of mobile applications for tourism. According to the research, introducing cutting-edge technological features and services will reduce client apprehension and uneasiness about mobile applications. Additionally, mobile applications with cutting-edge technical capabilities and services would improve their value and use. The findings of this study offer insightful information for stakeholders on how to successfully use mobile applications in their service marketing operations.

Individuals with technology usage habits and opinions of their utility and usability are more likely to use tourism mobile applications (TMAs), even when personality qualities like optimism, innovation, discomfort, and anxiety do not directly impact this intention. For tourism management organizations, tourist locations, and tourism-related enterprises, this result provides a management framework. It supports the development of Vietnam's tourism sector into a holistic "smart" tourism environment by foreseeing future tourist markets like Vietnam's Gen Z.

Additionally, in the context of Industry 4.0, the development of a smart tourism ecosystem that connects all stakeholders, including visitors, service providers, and government management agencies, is being promoted by the trend of using TMAs in the Gen Z tourism market by tourism management agencies, tourist destinations, and businesses. It is crucial for application software developers to concentrate on making application usage for consumers convenient, simple, and accessible.

The digital applications developed by state tourism management agencies and tourist destinations/localities, such as Safe Vietnam Tourism, Smart Travel, Tourism Management and Business, Smart Thanh Hoa, My Hanoi, and Fantastic Danang, are currently experiencing low-interest rates among the Gen Z demographic. This can be attributed to various factors such as a monotonous interface, complex login process, lack of diverse and appealing information, and content that is not useful to users. Additionally, downloading multiple applications for a single agency or industry is inconvenient, affects phone processing speed, and takes up phone storage, leading to discomfort for users. Therefore, there is a need to invest in a synchronous application that is user-friendly, convenient, and useful with multiple features.

Tourism businesses must concentrate on giving the impression that their devices offer the most cutting-edge technological features, services, and benefits that are tailored to the needs of not only Gen Z tourists but also other generations with similar needs if they want to improve the digital experience and promote digital transformation. Despite the strength of OTAs in the sharing economy and is the top choice of Gen Z for every trip, many tourism businesses have not yet innovated. Gen Z tourists are interested in innovation and new technologies, and the ongoing 4.0 industrial revolution is being adopted worldwide, while many hotels, restaurants, and service facilities remain out of this trend. Hence, it is essential to focus on digital transformation and actively participate in the 4.0 industrial revolution to become smart tourism businesses in the era of everything becoming smarter. This will enable them to cater to the demands of the more knowledgeable and "smarter" tourists of the present.

Businesses in the tourism industry must do research and provide travelers with strategic products. One such strategy is to provide specialized tourist goods and services that are fit for

the special requirements of Vietnam's Gen Z population and are individualized. Additionally, all goods and services provided to Gen Z customers ought to be developed in the direction of "digitalization," incorporating contemporary technology to allow travelers to "touch" and "browse" comfortably, reducing direct contact during the travel process, and even providing services to clients while they are offline (without Internet or wifi).

CONCLUSION

This study aims to examine the interaction between readiness for technology elements, such as optimism, innovation, resilience, and anxiety, and acceptance of technology factors, such as perceived utility, perceived simplicity of use, trust, and habit, in relation to the desire to use smartphone apps in tourism (TMAs) among Generation Z people in Vietnam. Using structured questionnaires to gather information from 532 Gen Z respondents, the suggested research model was evaluated using partial least squares structural equation modeling (PLS-SEM). The results show that technical preparedness affects the desire to utilize TMAs indirectly through the mediating function of technology adoption rather than directly. Perceived utility, perceived simplicity of use, and habit also showed a favorable influence among the technological adoption characteristics, however, trust did not show a significant impact.

Despite the many novel contributions to theory and practice, this research is not exempt from limitations that require attention. Firstly, the study employed a convenient non-probability sampling method, which could lead to biased results and limited generalizability. Additionally, although the survey was conducted nationwide, some regions lacked participation, and others only had 1-2 participants in the survey. Hence, the involvement of a diverse group of tourists from various locations would increase the sample's representativeness. Secondly, the study did not identify behavioral differences among Gen Z tourists from different regions across the country, thus limiting the specificity and comprehensiveness of our understanding of this customer market. Furthermore, as the survey was conducted online during the Covid-19 pandemic, it was not possible to compare the travel behavior and TMA-related behavioral characteristics of Gen Z tourists with those of other generations in Vietnam.

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