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Article

# Enhancing tourism experiences through Chat-GPT with augmented reality: Exploring behavioral intentions and innovation adoption in Thailand's tourism industry

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**Abstract:** This study investigates the role of Chat-GPT with augmented reality applications in enhancing tourism experiences in Thailand, focusing on behavioral intentions and innovation adoption to reduce stress in the tourism industry. The research addresses two key objectives: identifying factors driving consumers' behavioral intentions to adopt AR apps and evaluating the robustness of a modified innovation framework for analyzing these intentions. A conceptual model integrating innovativeness, attitudes, perceived enjoyment, and revisit intentions was developed and tested using Structural Equation Modeling with data from 430 Thai tourists who have one to three years of mobile application experience. The findings highlight that service and technology innovation significantly influence perceived enjoyment and attitude, which in turn mediate the impact on behavioral intention to adopt augmented reality applications. At a significance level of $p < 0.001$, perceived enjoyment and attitude were identified as critical determinants of BI, underscoring the importance of intrinsic user experiences. Tourists are more likely to adopt augmented reality technologies based on personal perceptions and enjoyment rather than external recommendations. This research provides actionable insights for stakeholders in the tourism technology ecosystem, including technology providers, marketers, and policymakers. By emphasizing the interplay of social, emotional, and hedonic factors in shaping user attitudes, the study introduces a robust framework for advancing augmented reality applications in tourism. The findings underscore the importance of user-centric design to drive technology adoption and offer strategic guidance for developers and entrepreneurs aiming to enhance tourism experiences through innovative augmented reality solutions.

**Keywords:** Innovativeness; Perceived enjoyment; Attitudes; Chat-GPT; AR

## 1. Introduction

Chat-GPT, as an advanced language model, excels in natural language understanding and generation, facilitating seamless and intuitive human-computer interactions. Augmented Reality (AR), on the other hand, enhances real-world experiences by overlaying digital content onto physical environments, creating immersive and interactive settings. The convergence of Chat-GPT and AR holds transformative potential, enabling dynamic, context-aware interfaces that respond to user inputs in real time. This integration can redefine user engagement by combining the power of conversational AI with the visual interactivity of AR. Prior research highlights substantial progress in both domains, underscoring opportunities to merge these technologies for applications in education, healthcare, retail, and entertainment (Cho et al., 2023).

AR has the potential to redefine the tourism sector by creating immersive and interactive experiences that deepen visitors' engagement with destinations while promoting mindfulness and reducing stress. This transformation allows travelers to fully embrace their experiences, leading to enhanced satisfaction and well-being. However, further research is required to address the challenges associated with AR adoption, optimize its features, and fully integrate it into the tourism landscape to maximize its benefits for both consumers and stakeholders. With the innovative use of information technology (IT), the tourism industry has achieved and maintained sustainable competitive advantages, reshaping travel experiences and visitor engagement (Opazo-Basaez et al., 2022; Yin et al., 2023). IT advancements have catalyzed transformative innovations across tourism operations, communication channels, and customer engagement strategies, redefining traditional paradigms and creating immersive experiences for travelers (Cho et al., 2023; Kowalkowski et al., 2022). Augmented reality (AR) technologies, in particular, are revolutionizing the tourism landscape by enhancing destination appeal and engagement with historical and cultural landmarks.

AR, defined as "a system that seamlessly blends 3D virtual entities into real-time 3D environments using technologies developed for virtual reality" (Azuma, 1997), has transformed how travelers experience destinations. It bridges the gap between the real and virtual worlds, allowing users to interact with virtual reconstructions, digital overlays, and augmented environments in meaningful ways (Izard and Mendez, 2021). For instance, AR has enabled the recreation of historical landmarks, bringing them back to life and enriching travelers' experiences by providing a deeper understanding of cultural and historical contexts. Given the variety of technology adoption models, synthesizing these frameworks is essential to assess their applicability and impact on AR in tourism. Researchers have highlighted the significance of studying AR's influence on perceived usefulness, ease of use, and user attitudes in tourism (Omer Sami and Huseyin, 2019), as well as how AR applications shape traveler expectations and decision-making processes (Dacko, 2017; Yim et al., 2017). For example, AR applications in cultural sites allow visitors to visualize historical reconstructions, enriching their experiences and offering educational value (Heimo et al., 2014; Pejoska et al., 2016). Despite its potential, gaps remain in understanding the impact of AR features such as vividness, novelty, interactivity, and augmentation on tourists' behaviors and perceptions (McLean and Wilson, 2019). A significant challenge lies in the transparency of how AR affects tourists' value perceptions and engagement, particularly at historical and cultural sites (Fan and Dong, 2020). While the wealth of information about historical landmarks exists, effectively marketing these experiences through AR technologies requires greater attention (Kysela and Storkova, 2014). In conclusion, augmented reality has the potential to redefine the tourism sector by creating immersive and interactive experiences that deepen visitors' engagement with destinations. However, further research is required to address the challenges associated with AR adoption, optimize its features, and fully integrate it into the tourism landscape to maximize its benefits for both consumers and stakeholders.

The research objectives are twofold: (1) "What factors derive consumers' BI from adopting Chat-GPT with AR apps in Thailand's tourism industry? (2) "Is the modified innovation robust in terms of analyzing customers' BI to adopt Chat-GPT with AR

apps in Thailand's tourism industry." A conceptual model incorporating innovativeness, attitudes, perceived enjoyment, and intention to use in Chat-GPT with AR was developed Thai tourists using Structural Equation Modeling (SEM). The findings offer valuable insights for stakeholders in the tourism technology ecosystem, including technology providers, marketers, and policymakers. The study demonstrates that various social, emotional, and hedonic factors influence attitudes toward Chat-GPT with AR. Furthermore, the research provides an innovative framework to advance existing Chat-GPT with AR applications, offering practical guidance for tourism developers and entrepreneurs.

## 1.1. Theoretical and conceptual underpinnings

### 1.1.1. Augmented reality in Thailand

The AR software market in Thailand is undergoing rapid growth, driven by evolving customer preferences, market trends, local circumstances, and macroeconomic factors. Consumers in Thailand increasingly prefer AR software for its ability to create interactive and immersive experiences. These technologies enhance user engagement, providing innovative ways for consumers to interact with brands, products, and services. For businesses, AR offers substantial benefits in improving customer satisfaction, deepening engagement, and boosting sales, contributing to its rising adoption across industries.

In the tourism industry, AR software has emerged as a transformative tool. By offering interactive, educational, and immersive experiences, AR enriches tourists' understanding and enjoyment of historical landmarks and cultural sites. For example, AR applications enable users to explore sites with virtual guides, view reconstructions of ancient ruins, or access additional multimedia content, thereby creating stress-free and memorable experiences for travelers. These features not only enhance tourism but also help reduce stress by providing convenient, engaging, and accessible information tailored to individual needs.

Market trends show AR adoption extending beyond tourism into sectors such as retail, where customers can virtually try products, or education, where AR is used to create dynamic learning experiences. This trend underscores the versatility of AR technology in delivering unique solutions across industries. Thailand's strong technological infrastructure, coupled with a growing tech-savvy population, positions the country as an ideal environment for AR market expansion. Furthermore, government initiatives to promote the digital economy have bolstered the growth of AR technologies, fostering innovation and adoption.

In conclusion, the AR software market in Thailand is thriving, driven by consumer demand for immersive experiences and businesses' recognition of AR's potential to enhance engagement. In the tourism sector, AR not only boosts visitor satisfaction but also reduces stress by simplifying and enriching travel experiences. With continued investment and innovation, AR technology is poised to play a pivotal role in shaping Thailand's tourism and digital economy.

## 1.2. Literature review

The foundational model for Augmented Reality in Tourism adoption, initially established by Feng and Mueller (2019), Fan and Dong (2020b), and Yim et al. (2017), identifies critical constructs such as innovativeness, attitude, behavioral intention to use, and revisit intention. These constructs are widely recognized as essential predictors of tourists' willingness to accept AR. In this study, these components serve as direct predictors for evaluating the likelihood of AR adoption among tourists.

Recently, researchers have intensified their exploration of global adoption strategies for AR technologies, employing diverse methodologies to understand the formation of user intentions (Dacko, 2017; Fan and Dong, 2020b). Within the tourism sector, qualitative studies like those by Klubnikin (2016) have illuminated factors influencing consumer perceptions and willingness to use mobile AR. These factors include information quality, system reliability, cost, personal innovativeness, perceived risks, ease of use, user satisfaction, and facilitating conditions.

Importantly, Gharaibeh et al. (2021) introduced perceived playfulness as a vital external variable in their study on AR technology adoption for preserving UNESCO world heritage sites, highlighting the significance of perceived enjoyment in shaping user adoption. Similarly, Heimo et al. (2014), in a comparative study on AR adoption in heritage tourism across South Korea and Ireland, revealed that perceived usefulness correlates strongly with the aesthetic appeal and user-friendliness of AR applications. The study further found that enjoyment was a key predictor of usability, directly influenced by aesthetics. It emphasized that intentions to use AR were driven by factors such as utility, enjoyment, social influence, and ease of use.

Slade et al. (2015), in their evaluation of the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) framework, noted that while not all constructs immediately impact user intentions, facilitating conditions, performance expectations, habits, and hedonic motivation are pivotal in shaping technology adoption in tourism (Abirami et al., 2023). These insights align with recent findings emphasizing perceived enjoyment as an emerging determinant in technology adoption, particularly in tourism. Enjoyment has been shown to enhance user engagement and satisfaction, fostering a positive attitude toward AR applications and driving intentions to use and revisit tourism sites enhanced by AR technologies.

This aligns with Wang et al. (2022), which underscores the role of emotional engagement in augmenting user acceptance of digital innovations. Joyfulness and perceived enjoyment are now seen as central to enhancing user experiences, encouraging behavioral intentions, and promoting sustained usage of AR in tourism.

Despite these advancements, critical gaps remain. Many studies were conducted in contexts vastly different from Thailand, limiting their applicability to the Thai tourism industry. Additionally, as AR remains a relatively new concept in Thailand, this study diverges from prior research that predominantly focused on existing AR users. Instead, it prioritizes understanding the intentions of potential users within Thailand's unique cultural and industry-specific framework. By doing so, it aims to bridge these gaps and provide actionable insights for effective AR implementation in the Thai tourism sector.

## 1.3. Hypotheses development

### 1.3.1. Service innovation and technology innovation

The concept of service innovation (SI) has garnered relatively little attention compared to other areas of innovation research, despite its critical role in modern industries. According to Berry et al. (2006), innovation in service organizations is inherently more complex than in physical product innovation due to the intangible and dynamic nature of services. For both service and manufacturing industries, innovation definitions often distinguish between "product" and "process" (Tether et al., 2002). However, numerous scholars have provided nuanced interpretations of SI, enriching our understanding of its multifaceted nature. Flikkema et al. (2010) described SI as a comprehensive process involving the creation, implementation, and marketing of service and product clusters to generate value-driven client experiences. Sunbo and Gallouj (2000) expanded this by characterizing SI as a combination of replicable innovations and minor, non-replicable adjustments tailored to meet specific client needs. Additionally, Toivonen and Tuominen (2006) emphasized SI as the implementation of a novel system or the enhancement of an existing service, provided it delivers measurable value to the organization. They further highlighted that such enhancements must incorporate up-to-date elements while being adaptable to new contexts (Vos, 2010). More recent studies underscore the critical role of SI and technology innovation in driving competitive advantage and enhancing customer experiences. Rahman et al. (2021) demonstrated how technology-enabled personalization in services significantly boosts user adoption and satisfaction. Similarly, Kumar et al. (2023) explored SI's impact on competitive differentiation within digital tourism platforms, revealing that innovative services not only attract new customers but also foster loyalty and repeat engagement.

In the context of technology innovation, the integration of digital tools into service delivery has transformed various industries, particularly tourism. Research by Heimo et al. (2014) and McLean and Wilson (2019) illustrates how augmented reality (AR) and other digital technologies enhance perceived enjoyment, ease of use, and customer engagement. Furthermore, Slade et al. (2015) highlighted that construct like hedonic motivation, social influence, and facilitating conditions play pivotal roles in shaping technology adoption in tourism services. The evolving interplay between service and technology innovation suggests a symbiotic relationship, where advancements in one domain fuel growth in the other. These findings align with the foundational framework for Augmented Reality in Tourism adoption, established by Feng and Mueller (2019), Fan and Dong (2020a), and Yim et al. (2017). Constructs such as innovativeness, attitude, behavioral intention, and Perceived enjoyment remain central to understanding the adoption and impact of both SI and technology innovation in tourism and other industries.

Consequently, this study builds on the existing literature, proposing hypotheses that connect SI and technology innovation with innovativeness, attitude, behavioral intention, and Perceived enjoyment, particularly within the unique contexts of emerging markets and digital transformation. This approach offers actionable insights into how service organizations can leverage innovation to meet evolving customer needs and sustain competitive advantage in an increasingly technology-driven world.

H1: Service innovation has a direct impact on user attitudes regarding the behavioral intentions to use Chat-GPT with augmented reality.

H2: Service innovation has a direct impact on perceived enjoyment with respect to the behavioral intentions to use Chat-GPT with augmented reality.

H3: Technological innovation has a direct influence over the attitudes of users toward the behavioral intentions to use Chat-GPT with augmented reality.

H4: Technological innovation has a direct influence on perceived enjoyment in relation to the behavioral intention to use Chat-GPT with augmented reality.

### 1.3.2. The impact of attitude toward AR on behavioral intention in Tourism

It has been discovered that a person's attitude toward new information technology (IT) significantly influences their behaviors and decision-making processes (Davis et al., 1989). The correlation between a person's attitude toward a technology and their intention to use it continues to be a widely researched topic in the fields of information systems, tourism, and hospitality (Ayeh et al., 2017; Chen et al., 2022; Cheng and Cho, 2014; Davis et al., 1989; Hoque et al., 2019; Kim et al., 2012; Liu and Li, 2015). In other words, an individual's attitudes explicitly determine their behavioral intentions. For instance, Ayeh et al. (2017) discovered a significant positive correlation between attitude and intention to employ consumer-generated media in tourism. In the context of this research, having a favorable disposition toward AR is referred to as having a positive attitude toward AR. If users have a favorable opinion of AR, there is a greater likelihood that they will engage with the technology again in the future. Therefore, a more positive attitude toward AR is likely to influence the intention to use it.

Furthermore, IT technologies such as AR are essential mechanisms that shape the tourism industry, with researchers emphasizing the relationship between IT and tourism due to IT's significant impact on traveler experiences and behaviors (Law et al., 2021). Travelers form positive or negative perceptions of AR when employing it at historical sites or attractions. Individuals whose attitudes have been shaped by their AR experiences create AR-based images of heritage destinations, which subsequently influence their travel intentions (Nadeau et al., 2015). Moreover, Kaplanidou and Vogt (2011) emphasized that utilizing IT, such as travel websites, serves as a motivating force for tourists to visit specific destinations. The use of AR as a promotional and persuasive tool for destinations holds immense potential to be a decisive factor in determining travel intentions. This study, therefore, proposes an additional hypothesis based on these insights.

H5: Attitude has a direct influence on the behavioral intentions to use Chat-GPT with augmented reality.

### 1.3.3. The influence of attitudes on behavior and the role of perceived enjoyment

The Theory of Planned Behavior (TPB) highlights attitudes as a pivotal determinant of behavioral intentions, a relationship supported by extensive research across various domains. Attitudes have been shown to significantly influence preferences for tourist destinations (Kaplanidou and Vogt, 2006), adoption of digital media (Alaeddin et al., 2018), engagement with electronic public services (Suh and Han, 2003), mobile commerce (Scholz and Duffy, 2018), and artificial intelligence (AI) services (Fan and Dong, 2020a). Attitude refers to an individual's positive or

negative evaluation of specific actions or behaviors (Nasri and Charfeddine, 2012). These evaluations are context-dependent and can range from mild to strong, shaped by cumulative learning experiences over time. Attitudes act as a cognitive filter that shapes how individuals perceive and respond to possible actions, such as purchasing a product or adopting a service. For instance, in the context of mobile food delivery applications, attitudes are influenced by a user's overall assessment of their experiences, including timeliness, ease of use, and quality. Positive experiences cultivate favorable attitudes, increasing the likelihood of continued usage and encouraging. Perceived enjoyment has emerged as a key variable that enhances the understanding of attitude formation in the adoption of technologies. Perceived enjoyment refers to the degree of pleasure or intrinsic satisfaction an individual derives from using a technology, independent of its utilitarian value. Research demonstrates that perceived enjoyment plays a critical role in shaping positive attitudes toward technologies in contexts such as mobile application, augmented reality (AR) (Rahman et al., 2021). For instance, in AR-based learning environments, perceived enjoyment has been found to not only improve user engagement but also reinforce positive attitudes, making learners more likely to continue using the technology (Chen et al., 2022). In tourism, perceived enjoyment significantly impacts travelers' attitudes toward AR-based tools for exploring heritage sites and attractions. Studies reveal that the immersive and entertaining features of AR enhance user satisfaction, fostering positive attitudes that increase the likelihood of revisiting destinations or recommending them to others (Gharaibeh et al., 2022; Yim et al., 2021).

Moreover, perceived enjoyment enhances behavioral intentions by creating an emotional connection between users and the technology. Travelers who experience enjoyment while using AR are more likely to view the destination positively, increasing their overall intention to visit. In addition, perceived enjoyment interacts synergistically with utilitarian factors like perceived usefulness and ease of use. This dual influence underscores the importance of designing technologies that balance functional benefits with pleasurable user experiences. For instance, He et al. (2021) found that AR applications that are both enjoyable and practical lead to stronger adoption intentions in the tourism sector, emphasizing that perceived enjoyment can amplify the impact of other positive factors on attitudes and behaviors. This growing focus on perceived enjoyment highlights its importance in fostering positive attitudes, driving user engagement, and shaping long-term behavioral intentions in both technology adoption and service contexts. Understanding and leveraging this variable can help businesses design more effective strategies to enhance customer satisfaction, loyalty, and advocacy.

### 1.3.4. Perceived enjoyment

Perceived enjoyment refers to the extent to which an experience is considered enjoyable, independent of the expected outcome of the interaction (Venkatesh and Davis, 2000). It is driven by intrinsic motivation or hedonism, encompassing feelings of enjoyment, relaxation, amusement, and joy, which play a crucial role in the successful adoption of modern applications and systems for consumer behavioral intention (BI) (Baabdullah, 2018; Tan and Ooi, 2018). Numerous studies have highlighted the impact of PEJ on the acceptance of augmented reality (AR)

applications, particularly in creating engaging environments. For example, Haugstvedt and Krogstie (2012) demonstrated that mobile AR apps designed for cultural heritage sites foster positive user engagement, as seen in popular applications like Pokémon Go. Similarly, Balog and Pribeanu (2010) identified Perceived enjoyment as a significant factor contributing to favorable behavioral intentions toward AR-based teaching platforms. Building on these findings, the importance of PEJ in influencing user attitudes and behavioral intentions suggests its potential as a key variable in the adoption of AR technologies, leading to the formulation of the next hypothesis. Like this, we indicate the next hypothesis:

H6: Perceived enjoyment has a direct influence on the behavioral intentions to use Chat-GPT with augmented reality.

### 1.3.5. Revisit intention and the role of perceived enjoyment

Revisit intention has been widely studied in hospitality and tourism research due to its importance in fostering customer loyalty and ensuring sustained success. Recent studies emphasize the critical role of perceived enjoyment in shaping customers' intentions to return to a service or destination. Perceived enjoyment refers to the intrinsic satisfaction derived from an experience, independent of the functional benefits of the service or product (Venkatesh and Davis, 2000). In the context of revisit intention, perceived enjoyment enhances customer engagement, satisfaction, and emotional attachment, making it a significant determinant of repeat behavior. For example, Haugstvedt and Krogstie (2012) demonstrated that users of augmented reality (AR) applications at cultural heritage sites reported heightened enjoyment, which increased their likelihood of revisiting those destinations. Similarly, Rahman et al. (2021) found that PEJ positively influenced the intention to revisit e-commerce platforms, particularly when users found the interaction with the interface pleasurable and engaging. In online settings, perceived enjoyment plays a mediating role between usability factors such as ease of use, perceived usefulness, and revisit intention. Studies by Ha and Stoel (2009) and Roca et al. (2009) empirically support the link between user satisfaction derived from enjoyable interactions and their intent to return. In digital tourism, Kitcharoen (2019) highlighted that perceived enjoyment enhances the booking intentions of Thai online travel service users, suggesting that enjoyable experiences lead to stronger loyalty and repeat usage.

Perceived enjoyment also interacts with perceived benefits and risk. For instance, Choi et al. (2013) demonstrated that while perceived benefits like information quality and security strongly influence revisit intention, enjoyment further enhances these effects by creating a positive emotional response. Dinev and Hu (2007) emphasized the role of enjoyment in mitigating perceived risks, such as privacy and security concerns, in online environments. These findings align with Wibowo et al. (2020), who established the importance of enjoyment in bridging the gap between initial adoption and long-term engagement in online applications. Moreover, studies on AR adoption have highlighted the significance of PEJ in driving revisit intentions. Gharaibeh et al. (2022) illustrated that users who derive enjoyment from AR-based experiences at heritage sites are more likely to return, not only for the educational benefits but also for the immersive and entertaining aspects of the technology.

Similarly, Vijayasarathy (2004) found that enjoyment acts as a motivational factor in encouraging users to revisit and engage with AR platforms.

In conclusion, perceived enjoyment is an essential factor influencing revisit intention, extending beyond traditional factors like WOM and perceived benefits. Its role in enhancing emotional satisfaction, mitigating risks, and fostering user loyalty underscores the importance of designing services and technologies that prioritize pleasurable and engaging user experiences. These insights provide actionable directions for businesses aiming to improve customer retention and encourage repeat visits in both physical and digital environments.

H7: Behavioral intention to use has a direct influence on the revisit Chat-GPT with augmented reality.

Experimental studies conducted in Thailand have found no evidence to suggest that attitude or perceived enjoyment mediates the effects of service innovation, technological innovation, and behavioral intention to utilize AR. As a result, the indirect effects of service innovation, technology innovation, and behavioral intention to use ART with attitude of acceptance and perceived enjoyment as mediating factors (H7, H8, H9 and H10) were assessed in this research. Thus, the following hypotheses are suggested: (show in **Figure 1**)

H8: Service innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by attitude.

H9: Service innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by perceived enjoyment.

H10: Technology innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by attitude.

H11: Technology innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by perceived enjoyment.

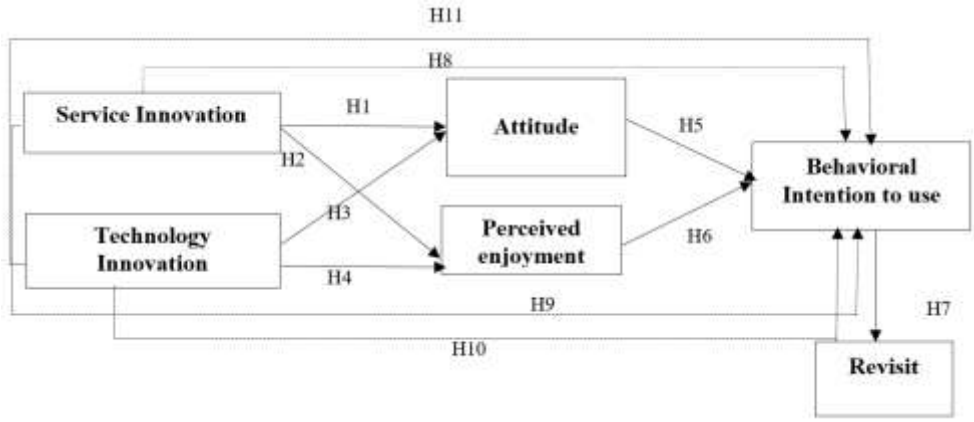


**Figure 1.** Research model.

## 2. Methodology

A quantitative survey approach was employed for this investigation. The use of numerous validated scales from studies related to AR facilitated the effective measurement of latent variables. The questionnaire was divided into two sections. The first section assessed respondents' familiarity with AR, while the second section gathered demographic information

## 2.1. Population, sampling, and data collection

Cochran's formula (1953) was applied to determine the appropriate sample size for this investigation, resulting in a minimum requirement of 385 participants.

Data collection was conducted through both online and onsite questionnaires. Prior to distribution, the researcher provided an explanation of the study's purpose to ensure a representative sample. The questionnaire included filtered questions accessible via mobile devices. Respondents were required to have sufficient experience with smartphones, defined as a minimum of three months of usage (Mclean et al., 2018).

A combination of snowball and convenience sampling methods was employed to recruit participants. Snowball sampling involved participants referring peers or acquaintances, while convenience sampling was used to distribute the survey through social media platforms. As Bhattacherjee (2012) notes, relying solely on student respondents may not yield results representative of the general population.

The initial respondents referred others or distributed the online questionnaire to individuals with prior experience in tourism activities. Approximately 720 tourists were invited to participate, with 430 (60%) responding a final sample of participants.

To address potential common method bias (CMB), Harman's single-factor test was conducted. The cumulative variance extracted in the analysis was 42.20%, well below the 50% threshold, indicating no significant CMB issues.

## 2.2. Variable measurement

Questionnaire surveys were used to collect statistical information for this research. The following methods and tools were utilized in the development of the questionnaire:

- The seven-item scale for measuring service innovation and technology innovations were adapted from Darden and Perreault (1976); Leavitt and Walton (1975); Oliver and Bearden (1985) which consists of 7 items.
- The measurement of attitude, which consists of 4 items, was adapted from Hoque et al. (2015) and Liu and Li (2011) which consists of 4 items.
- The measurement of perceived enjoyment was adapted from McLean and Wilson (2019), which consists of 3 items.
- Details in behavioral intention to use comprising of 3 items, were adapted from Namahoot and Jantasri, (2022).
- The measurement of revisit was adapted Liu and Lee (2016), which consists of 3 items.

All of the scales that were included in the survey questionnaire were assessed using a 5-point Likert scale, with 1 representing "Strongly Disagree", 2 representing "Disagree", 3 representing "Neither Agree nor Disagree", 4 representing "Agree", and 5 representing "Strongly Agree". The participants were instructed to indicate how they felt about each survey statement/question by marking the appropriate scale.

## 2.3. Validation of measurement methods

Researchers assessed the validity of the questionnaire in two stages. Before data collection, professional and pilot testing were conducted to identify potential issues.

The questionnaire specified the estimated completion time for the survey. A preliminary draft was reviewed by a panel of experts to gather feedback on its content (Saunders et al., 2007). Subsequently, professional representatives were consulted to verify the accuracy of the questions (Hair et al., 2010).

To ensure the survey instrument's relevance in the Thai context, questionnaires were also shared with tourism technology experts and academics from various Thai universities. A preliminary test was then conducted to validate the instrument, involving 30 individuals with prior experience using AR in Thailand's tourism industry. Participants provided feedback on the syntax and structure of the survey, confirming the instrument's validity.

To assess the reliability of the measurements, responses from the 30 preliminary test participants were analyzed using IBM SPSS version 20. The reliability test for the 18-item questionnaire yielded a Cronbach's alpha of 0.880, exceeding the minimum acceptable threshold of 0.7, thereby demonstrating a high level of reliability (Hair et al., 2010).

Further statistical analyses were performed to determine the internal consistency of the instrument. Exploratory factor and correlation analyses were conducted by confirmatory factor analysis (CFA) and structural equation modeling (SEM)

## 3. Data analysis and results

To assess one-dimensionality, frequency and descriptive analyses were conducted, focusing on variability, mean, percentage, and normality testing. Hypothesis validation was performed using confirmatory factor analysis (CFA), convergent validity (average variance extracted, AVE), discriminant validity, and structural equation modeling (SEM).

### 3.1. Descriptive statistics

This study collected 720 usable responses from an online survey questionnaire. Following an initial evaluation of the test samples responses with z-scores above (−3, 3) were excluded to prevent deviations, resulting in a final test sample of 430 online surveys.

Frequency analysis was used to evaluate the demographic profile of the 430 respondents. Sixty one percent of the respondents were female (68%) aged between 31 and 35 years (42.00%), held an undergraduate degree (54.10%), worked in the government (32.50%), and earned monthly incomes in excess of 30,000 Baht (45.7 %). Approximately 40.60% of the study participants had one to three years of experience with mobile application.

Tourist viewed service innovation and technology innovation favorably, believing that AR is convenient and practical" (4.210). in service innovation. In Technology innovation terms of technological advancement, they believed that "the platform is user-friendly" (4.214). In terms of attitude and perceived enjoyment, they perceived online platforms as something that gives them a sense of modernity (3.815 and 4.560).

### 3.2. Assessment of univariate normality

The following is a description of the three-stage method that the measurement model uses. First, by having skewedness values less than 2 (± 2.0) and kurtosis values that were less than 7 (± 7.0), all of the model's components were able to validate the assumption of normality (Curran et al., 1996). Cronbach's alpha was then utilized to determine the internal reliability of the scales and the constructs. All values of Cronbach's alpha must be greater than 0.70, which is the recommended threshold value (Hair et al., 2010). The results of Cronbach's alpha on an overall scale are presented in **Table 1**.

**Table 1.** Results for reliability analysis.

| **Observed Variables** | **Cronbach's alpha** |
|---|---|
| **Service Innovation** | ($\alpha$) = 0.816 |
| (SI1) I find Chat-GPT with augmented reality useful when enjoying the city. | |
| (SI2) Using Chat-GPT with augmented reality enables me to obtain information about points of interest and receive enhanced city guidance. | |
| (SI3) Using Chat-GPT with augmented reality increases my interest to visit new places. | |
| (SI4) Interaction with Chat-GPT with augmented reality is user-friendly. | |
| **Technology Innovation** | ($\alpha$) = 0.717 |
| (TI1) I like to explore new information technologies such as Chat-GPT with augmented reality. | |
| (TI2) If I discover a new information technology, such as Chat-GPT with augmented reality application, I would seek out opportunities to explore it. | |
| (TI3) I am typically the first among my peers to utilize innovative information technology such as Chat-GPT with augmented reality. | |
| **Attitude** | ($\alpha$) = 0.734 |
| (ATT1) Using the Chat-GPT with augmented reality in a travel destination is a good idea. | |
| (ATT2) Using the Chat-GPT with augmented reality in a travel destination is a logical idea. | |
| (ATT3) I like the idea of using Chat-GPT with augmented reality in a travel destination. | |
| (ATT4) Using an Chat-GPT with augmented reality enhances the learning experience. | |
| **Perceived enjoyment** | ($\alpha$) = 0.790 |
| (ENJ1) I find the experience of using this Chat-GPT with augmented reality to be enjoyable. | |
| (ENJ2) Using this system/tool/service is fun and entertaining. | |
| (ENJ3) I find the experience of using this system/tool/service to be enjoyable. | |
| **Behavioral Intentions to Use** | ($\alpha$) = 0.711 |
| (BI1) I intend to utilize Chat-GPT with augmented reality in the future. | |
| (BI2) I intend to utilize Chat-GPT with augmented reality when I travel to a particular destination. | |
| (BI3) It is probable that I will utilize Chat-GPT with augmented reality at a future travel destination. | |
| **Revisit** | ($\alpha$) = 0.702 |
| (RE1) I revisit to utilize Chat-GPT with augmented reality in the future. | |
| (RE2) I feel confident using Chat-GPT with augmented reality technology in my daily life. | |
| (RE3) I find Chat-GPT with augmented reality applications easy to understand and navigate. | |

To assess the level of adequacy, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted. **Table 1** presents the EFA results

using Varimax rotation along with the Cronbach's alpha coefficients for the variables. According to Hair et al. (2010), Cronbach's alpha should exceed 0.7, while Nunnally et al. (1994) recommended a stricter minimum threshold of 0.70. All scale values surpassed this threshold, thereby meeting the reliability criteria.

Factor loadings for individual items were required to exceed 0.5, as suggested by Hair et al. (2010). Once the EFA yielded satisfactory results, CFA was performed to evaluate model fitness, convergent validity, and discriminant validity. Subsequently, structural equation modeling (SEM) was employed to analyze the causal relationships between the variables.

### 3.2.1. Convergent validity

To assess the convergent validity of this study's findings, factor loadings, composite reliability (CR), and average variance extracted (AVE) were calculated based on the criteria established by Fornell and Larcker (1981). The results of this analysis are presented in **Table 2**.

**Table 2.** Validity based on the outcomes of standardized loadings.

| Constructs and Items | Factor Loadings | CR | AVE | Discriminant validity | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| **Revisit** | | 0.908 | 0.767 | 0.876 | | | | | |
| VI1 | 0.879 | | | | | | | | |
| VI2 | 0.843 | | | | | | | | |
| VI3 | 0.811 | | | | | | | | |
| **Attitude** | | 0.870 | 0.691 | 0.782 | 0.832 | | | | |
| AT1 | 0.744 | | | | | | | | |
| AT2 | 0.790 | | | | | | | | |
| AT3 | 0.805 | | | | | | | | |
| AT4 | 0.688 | | | | | | | | |
| **Service Innovation** | | 0.903 | 0.701 | 0.778 | 0.833 | 0.855 | | | |
| SI1 | 0.798 | | | | | | | | |
| SI2 | 0.869 | | | | | | | | |
| SI3 | 0.835 | | | | | | | | |
| SI4 | 0.841 | | | | | | | | |
| **Technology Innovation** | | 0.866 | 0.684 | 0.788 | 0.841 | 0.955 | 0.705 | | |
| TI1 | 0.837 | | | | | | | | |
| TI2 | 0.848 | | | | | | | | |
| TI3 | 0.848 | | | | | | | | |
| **Perceived Enjoyment** | | 0.856 | 0.665 | 0.848 | 0.821 | 0.853 | 0.874 | 0.822 | |
| PJE1 | 0.733 | | | | | | | | |
| PJE2 | 0.766 | | | | | | | | |
| PJE3 | 0.756 | | | | | | | | |
| **Behavioral Intentions to Use** | | 0.887 | 0.723 | 0.812 | 0.780 | 0.814 | 0.848 | 0.925 | 0.901 |
| BI1 | 0.795 | | | | | | | | |
| BI2 | 0.766 | | | | | | | | |
| BI3 | 0.778 | | | | | | | | |

The standardized loadings and validity tests indicated that all values met the required thresholds, confirming that the convergent validity was satisfactory (see **Table 2**).

### 3.2.2. Discriminant validity

To determine the discriminant reliability of the constructs, the square root of AVE was computed and compared to the correlation between each variable.

Standardized loadings and validity test results (as shown in **Table 2**) demonstrated that the AVE values were significantly greater than the correlation coefficients, suggesting a good discriminant validity score.

## 3.3. Assessment of the measurement model

In the second phase, 22 items were used to evaluate the CFA. The goodness-of-fit in SEM was determined based on the degree of replication of the estimated covariance matrix among the indicator variables. The model fit was assessed by reviewing a set of indices, and the results were classified into the following four categories (Hair et al., 2010): The measurement model fits the data satisfactorily (CMIN = 3.071, *p*-value > 0.000), RMR = 0.023, RMSEA = 0.074, IFI = 0.901, CFI = 0.901, TLI = 0.900, PNFI = 0.670, and AGFI = 0.841).

### 3.3.1. Structural model results

*Path analysis*

The illustrate the constructs' path estimates in the final stage. The results indicate that service innovation and technological innovation support the significance of hypotheses H1, H2, H3, and H4. In reference to attitude and Perceived enjoyment, H5 and H6 are found to be statistically significant. (as shown in **Table 3**, **Figures 2** and **3)**

Based on the results, service innovation has the highest impact on attitudes and perceived enjoyment in the context of AR (H1: $\beta = 0.711$, H2: $\beta = 0.542$, $p \leq 0.000$) and Technology innovation has impact on attitudes and perceived enjoyment in the context of AR (H3: $\beta = 0.412$, H4: $\beta = 0.629$, $p \leq 0.000$). Additional, Attitudes has impact on behavioral intention to use AR (H5: $\beta = 0.067$, $p \leq 0.702$) and Perceived enjoyment has impact on behavioral intention to use AR (H6: $\beta = 0.629$, $p \leq 0.000$). behavioral intention to use has impact on visiting to use AR (H7: $\beta = 0.629$, $p \leq 0.000$).

Regarding the indirect effect H8, H9, H10 and H11 were associated with equally strong unique latent variables and a bootstrapped sampling distribution of the difference in vs estimates (Dvs) was estimated via 2000 parametric bootstrapped replications. In Amos 21 (Arbuckle, 2012), such a test could be performed by creating a user-defined estimate. The results supported H8, H9, H10 and H11 in which attitude, and perceived enjoyment as mediators of behavioral intention to use AR. We found that the indirect effect of service innovation and technology innovation through attitude ($\beta = 0.558$, $\beta = 0.585$, $p \leq 0.000$). were greater than the indirect effect of service innovation and technology innovation through perceived enjoyment. ($\beta = 0.452$, $\beta = 0.473$, $p \leq 0.000$).

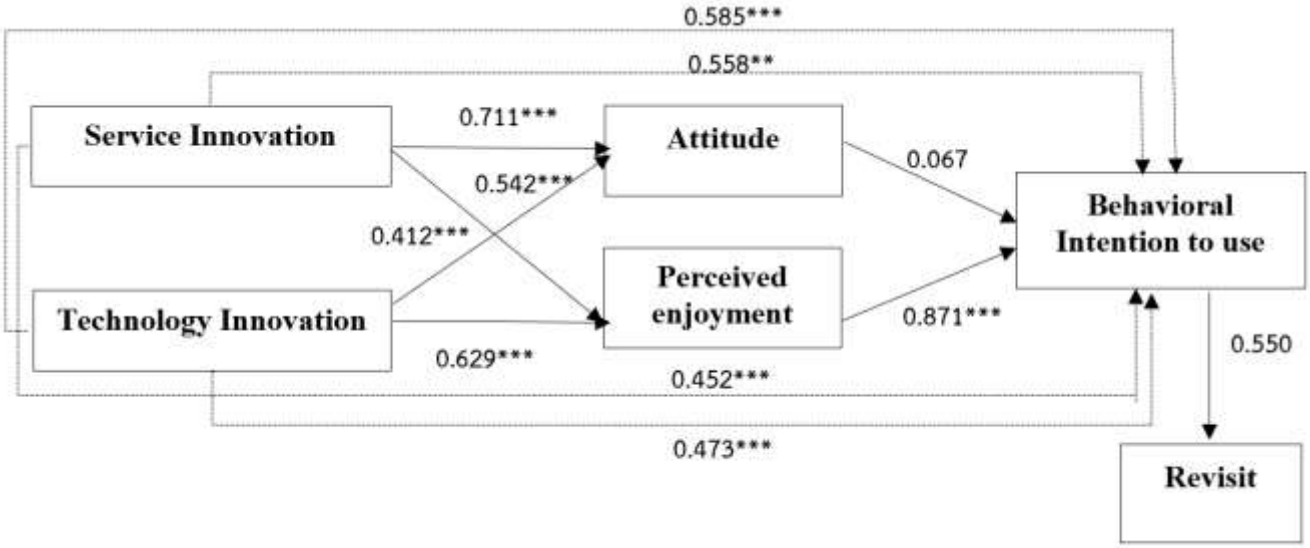


**Figure 2.** Results of structural model analysis.

Note: *** $p < 0.001$.

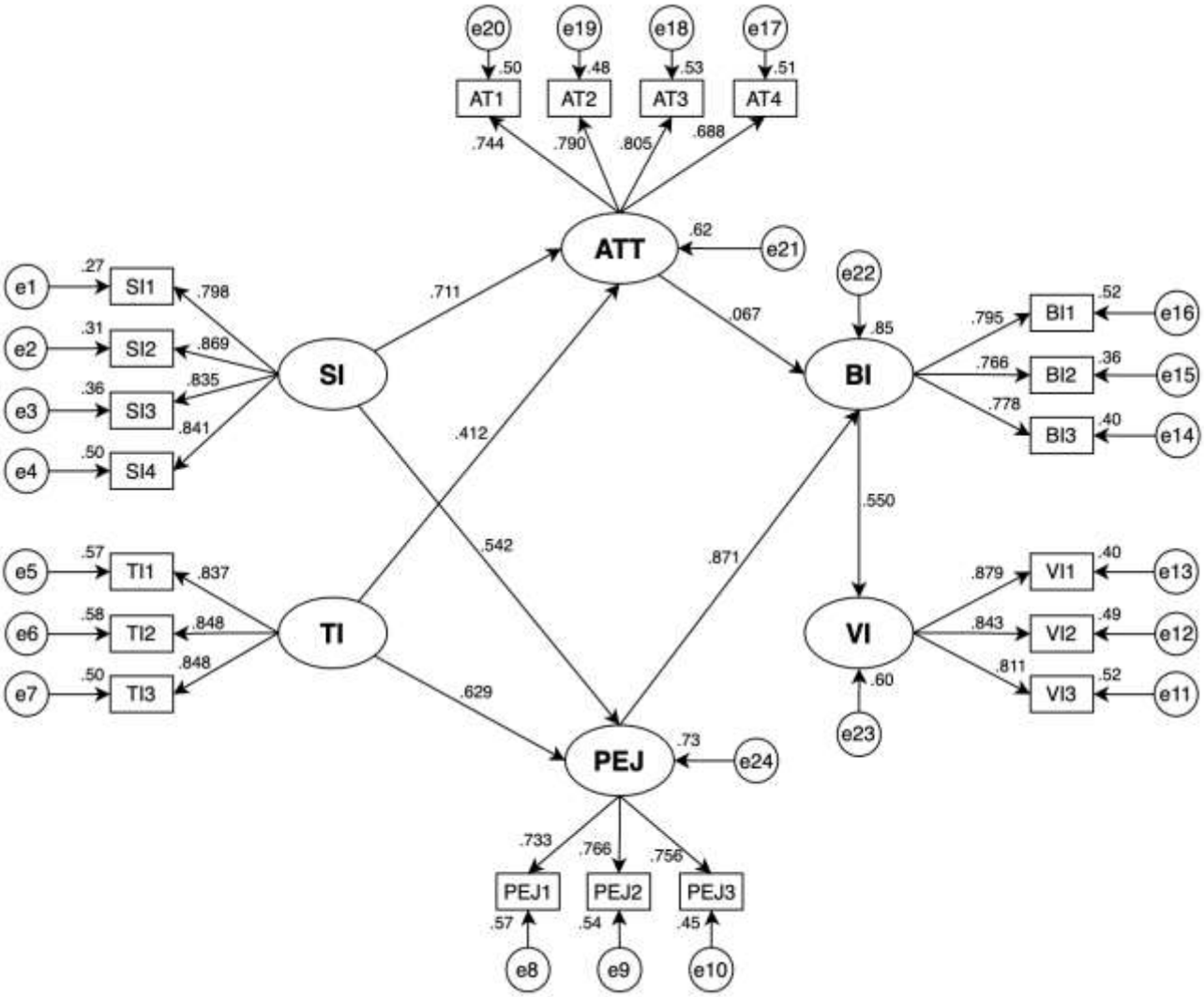


**Figure 3.** Final analysis of structural model.

**Table 3.** Evaluation and testing of research hypotheses.

| Hypothesis | Result | Standardized Estimate |
|---|---|---|
| H1: Service innovation has a direct impact on user attitudes regarding the behavioral intentions to use Chat-GPT with augmented reality. | Supported | 0.711*** |
| H2: Service innovation has a direct impact on perceived enjoyment with respect to the behavioral intentions to use Chat-GPT with augmented reality. | Supported | 0.542*** |
| H3: Technology innovation positively influences user attitudes toward the use Chat-GPT with augmented reality. | Supported | 0.412*** |
| H4: Technology innovation has a direct impact on user perceived enjoyment regarding the behavioral intentions to use Chat-GPT with augmented reality. | Supported | 0.629*** |
| H5: Attitudes has a direct influence on the behavioral intentions to use Chat-GPT with augmented reality. | **Not Supported** | **0.067** |
| H6: Perceived enjoyment has a direct influence on the behavioral intentions to use Chat-GPT with augmented reality. | Supported | 0.871*** |
| H7: Behavioral intention to use has a direct influence on the revitsit Chat-GPT with augmented reality. | Supported | 0.550*** |
| H8: Service innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by attitude. | Supported | 0.558*** |
| H9: Service innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by perceived enjoyment. | Supported | 0.452*** |
| H10: Technology innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by attitude. | Supported | 0.585*** |
| H11: Technology innovation has indirect influence on the behavioral intention to use Chat-GPT with augmented reality, as mediated by perceived enjoyment. | Supported | 0.473*** |

Note: *** $p < 0.001$.

## 4. Discussion

The primary objective of this research was to identify the significant barriers preventing Thai consumers from adopting Chat-GPT with augmented reality technology. Path estimation revealed that service innovation and technology innovations significantly and positively influence behavioral intention to use Chat-GPT with augmented reality in Thailand. Furthermore, these innovations also have a substantial impact on the actual adoption of Chat-GPT with augmented reality. Similar findings regarding the critical role of service and technology innovations were observed by Venkatesh et al. (2012).

In the context of developing countries, transactional processes are often affected by the unpredictability of environmental conditions, resulting in inconsistent outcomes (Pang et al., 2006). This unpredictability highlights the importance of reducing the complexity and effort required to use technology. Oliveira et al. (2016) suggested that when users perceive a technology as easy to use and less complex, they are more likely to recognize its usefulness and advantages in completing tasks. Particularly, Chat-GPT with augmented reality adoption in tourism and retail sectors has been linked to the ability of Chat-GPT with augmented reality systems to create immersive, engaging, and user-friendly experiences, which enhance user satisfaction and behavioral intention. (Wang et al., 2020; Zhang and Teo, 2021)

This study incorporated service innovation, technology innovations, and behavioral intention to use Chat-GPT with augmented reality, achieving an extracted $R^2$ value of 83.2%, demonstrating the robustness of the model. The empirical findings

underscore that performance expectations are the most influential factor in shaping Thai consumers' behavioral intention to adopt Chat-GPT with augmented reality technology. This study contributes to the literature by extending the understanding of Chat-GPT with augmented reality adoption in developing markets like Thailand. It highlights the interplay between service and technology innovations and underscores the importance of addressing user expectations to foster Chat-GPT with augmented reality adoption. The findings align with recent technological trends and provide actionable insights for stakeholders aiming to develop and promote Chat-GPT with augmented reality applications tailored to Thai consumers.

Firstly, the dimension of service innovation is the most impactful aspect for Chat-GPT with augmented reality adoption in Thailand, demonstrating the highest factor loadings of 0.711 and 0.542 (as shown in **Figure 2**). This highlights the significance of AR in enhancing tourism experiences, particularly by increasing individual interest in exploring new places and fostering positive attitudes toward new locations. As observed by Bailey et al. (2017), the design of Chat-GPT with augmented reality tourism applications should prioritize interactivity, user-friendliness, and accessibility, ensuring seamless functionality for users. This aligns with the findings of Dacko (2020), who emphasized that simplicity and intuitiveness are key to improving user acceptance of Chat-GPT with augmented reality in the tourism industry. The user-friendliness and easy to access of Chat-GPT with augmented reality applications play a critical role in user adoption, as highlighted in Venkatesh et al. (2012). Recent studies, such as those by Park and Oh (2021), further support this, indicating that reducing the complexity of Chat-GPT with augmented reality navigation systems significantly enhances user satisfaction and intention to adopt. Moreover, a certain level of digital literacy is essential for users to independently interact with Chat-GPT with augmented reality technologies, fostering a sense of autonomy and confidence in utilizing the tools.

In addition to usability, the integration of social and communication services is vital for maximizing the value of Chat-GPT with augmented reality in tourism. These services establish a bridge between tourists and key stakeholders, such as exhibition owners, accommodation providers, and local businesses, facilitating seamless interaction and personalized service delivery (Cheng and Cho, 2011). Furthermore, recent research by Gharaibeh et al. (2021) highlights how Chat-GPT with augmented reality-enabled platforms allow tourists to share their experiences across multiple channels, including social media platforms like Facebook, Instagram, and TikTok, as well as travel-focused networks like TripAdvisor. These shared experiences not only contribute to the collective knowledge of destinations but also influence the decision-making processes of other travelers, amplifying the reach and impact of Chat-GPT with augmented reality applications. Moreover, advancements in AR technology since 2020 have introduced AI-enhanced features, such as personalized recommendations and real-time language translation, which further augment the value of Chat-GPT with augmented reality in tourism (Wang et al., 2022). These features address emerging consumer demands for convenience and customization, making Chat-GPT with augmented reality tools more appealing and effective in fostering engagement and satisfaction.

In conclusion, the dimension of service innovation, coupled with advancements in usability and social integration, remains a cornerstone for Chat-GPT with augmented reality adoption in tourism. The continual refinement of Chat-GPT with augmented reality functionalities, informed by user-centric design principles and technological advancements, is essential to maximizing its potential in enhancing tourism experiences. These developments not only drive user acceptance but also contribute to the broader digital transformation of the tourism sector.

Secondly, in terms of technology innovation, this dimension holds significant importance, with substantial factor loadings of 0.412 and 0.629. Chat-GPT with augmented reality for tourism in Thailand represents a cutting-edge technology that enhances modern tourism experiences by enabling tourists to acquire historical knowledge and accurate information about local attractions. As highlighted by Alaeddin et al. (2018), AR offers user-friendly interfaces that reduce visual barriers, improve accessibility, and provide convenience. This innovation differentiates Chat-GPT with augmented reality from traditional tourism by prioritizing the highest possible quality of user experience, aligning with the increasing expectations of tech-savvy travelers. Recent studies further validate the transformative potential of Chat-GPT with augmented reality. For example, research by Wang et al. (2022) emphasizes the importance of personalization and interactivity in Chat-GPT with augmented reality applications, which significantly enhance user satisfaction and engagement in tourism contexts. Similarly, Li et al. (2021) found that immersive Chat-GPT with augmented reality features improve tourists' perceived enjoyment, driving behavioral intentions to adopt Chat-GPT with augmented reality. These findings underscore the critical role of technology innovation in shaping the adoption of Chat-GPT with augmented reality technologies in tourism.

In the context of social influences, the Thai tourism industry places significant emphasis on the perceptions of various reference groups, including peers, relatives, and colleagues, as critical factors in influencing an individual's willingness to accept. Furthermore, recent research by Cantallops and Salvi (2014), established the positive influence of family members, co-workers, friends, and elders on users' intentions to adopt new technologies. More recent work, such as that by Park and Kim (2021), reinforces the relevance of social influences in technology adoption, showing that recommendations from trusted groups enhance both perceived usefulness and trust in Chat-GPT with augmented reality applications. Additionally, Abou-Shouk et al. (2023) demonstrated that social influence and perceived enjoyment work synergistically to drive adoption, especially in environments where cultural values prioritize collective decision-making, such as in Thailand.

These findings highlight the evolving dynamics of Chat-GPT with augmented reality adoption, emphasizing the interplay between technological innovation, social influence, and user experience in driving acceptance. As the industry continues to innovate, integrating real-time feedback and adaptive features into Chat-GPT with augmented reality applications can further enhance their relevance and usability, meeting the expectations of increasingly sophisticated travelers.

Thirdly, in terms of perceived enjoyment plays a pivotal role in the adoption of Chat-GPT with augmented reality in Thailand's tourism industry, as it directly influences user engagement and satisfaction. In a culture that values immersive and

memorable experiences, Chat-GPT with augmented reality applications that prioritize enjoyment are more likely to resonate with Thai tourists. Studies, such as Li et al. (2021), highlight that perceived enjoyment not only enhances the user experience but also strengthens behavioral intentions to adopt Chat-GPT with augmented reality by fostering positive attitudes toward the technology. Additionally, Wang et al. (2022) emphasize that the hedonic aspects of Chat-GPT with augmented reality, such as interactivity and gamified features, significantly impact the perceived value of the application, making it an essential factor in technology acceptance. This is particularly relevant in Thailand, where the tourism sector is driven by cultural richness and recreational travel, aligning perfectly with Chat-GPT with augmented reality ‘s ability to blend education, entertainment, and convenience. As a result, incorporating features that amplify enjoyment in AR applications can lead to higher adoption rates and increased satisfaction among Thai tourists.

However, our research indicates that attitude has no significant effect on the adoption of Chat-GPT with augmented reality. This finding contrasts with the results of Gharaibeh et al. (2021), who argued that attitude significantly influences consumer behavior toward Chat-GPT with augmented reality -based tourism applications. Recent studies have further explored this dynamic, suggesting that while attitude remains a critical factor in some contexts, its influence may diminish in environments where technological familiarity and hedonic motivations, such as perceived enjoyment, play a larger role (Gharaibeh et al., 2021; Wang et al., 2022). Our findings emphasize that customer perspectives are vital, particularly in terms of **service quality** and technological advancement, when deciding whether to promote the service to other potential users. This aligns with the broader literature, which highlights the importance of perceived quality and trust in driving behavioral intentions (Kim et al., 2021). Moreover, this analysis supports earlier research suggesting that an individual’s sense of responsibility stimulates behavioral responses, such as offering suggestions and recommendations (Jung et al., 2015).

Interestingly, our findings align with recent insights into risk-taking behavior in technology adoption. For example, Tao et al. (2023) noted that users are often willing to take personal risks when engaging with innovative technologies like Chat-GPT with augmented reality. However, they are hesitant to recommend such technologies to others unless they are confident in their safety, usability, and reliability. This suggests that trust and social responsibility play crucial roles in shaping the diffusion of Chat-GPT with augmented reality technologies, particularly in sensitive or high-stakes environments.

## 4.1. The role of attitude as a mediating variable

The mediating effects of attitude and perceived enjoyment are further supported by their significant positive influence on the intention to adopt Chat-GPT with augmented reality in Thailand’s tourism industry (**Table 3**). This suggests that a favorable attitude toward AR adoption indirectly enhances the likelihood of users utilizing Chat-GPT with augmented reality services. In essence, users with a positive perception of Chat-GPT with augmented reality adoption are more inclined to engage with the technology. Recent studies since 2020 emphasize the importance of these

mediators in Chat-GPT with augmented reality adoption. For example, Jalil et al. (2023) highlight that perceived enjoyment and emotional engagement play a crucial role in shaping user acceptance of AR applications in tourism, aligning with findings by Wang et al. (2022), which underline the importance of hedonic motivations in driving intention to use Chat-GPT with augmented reality. Moreover, the impact of service and technological innovation on user attitudes remains critical, as these factors indirectly influence perceived enjoyment and ultimately the intention to adopt Chat-GPT with augmented reality. Service providers should focus on improving service quality, particularly in enhancing employee communication skills and equipping staff with accurate knowledge and proactive customer service attitudes. Additionally, integrating Chat-GPT with augmented reality technology into collaborative storytelling projects offers educators and tourism facilitators new ways to create immersive experiences, fostering creativity and learner motivation. This approach aligns with Tomlinson's principles of differentiated learning by accommodating diverse user motivations and interests, further supported by recent research advocating for technology-enhanced narrative co-creation to enrich engagement and adoption.

#### 4.1.1. Practical implications

The findings of this study provide practical insights for the tourism industry to effectively integrate Chat-GPT with augmented reality applications to enhance tourism experiences. This research highlights the significant interplay between travelers' self-presentation motives and their behavioral outcomes regarding AR applications. While previous studies have primarily focused on adopting smart technologies, this research emphasizes an innovative approach to creating immersive digital tourism experiences in Thailand. Unlike traditional mobile AR applications, the potential exists for these systems to function as AI-powered tour guides, delivering cost-effective yet high-quality travel experiences.

Importantly, AR applications can significantly reduce travel-related stress by providing seamless navigation, intuitive recommendations, and context-aware guidance. These features enable travelers to make informed decisions without the anxiety often associated with planning and navigating unfamiliar destinations. By fostering mindfulness through immersive, present-focused exploration and enhancing enjoyment with interactive and engaging features, AR technology contributes to a more relaxed and fulfilling travel experience.

This study also reveals how service and technological innovation drive AR adoption among prospective travelers to Thailand. By enhancing the enjoyment of exploring destinations and stimulating curiosity about new places, Chat-GPT with augmented reality applications enable dynamic and enriched tourism experiences. The results indicate that utilitarian motivations, such as stress-free decision-making and personalized recommendations, have the greatest influence on travelers' attitudes toward AR applications. Additionally, validating the mediator effect of attitude allows AR application developers to better segment their target markets and refine marketing strategies tailored to specific traveler needs.

Developers can design advertisements that appeal to travelers' desire for self-presentation and publish them on platforms frequented by highly innovative individuals. Simultaneously, advertisements emphasizing stress reduction,

mindfulness, and enjoyment can target platforms popular among less innovative travelers seeking practical and emotional benefits. These dual marketing strategies enable AR applications to cater to both highly innovative and minimally innovative groups, thereby boosting adoption rates while promoting more enjoyable, mindful, and stress-free tourism experiences.

#### 4.1.2. Theoretical implications

Previous studies have primarily focused on factors such as perceived usefulness and ease of use in technology adoption (Davis et al., 1989; Venkatesh and Davis, 2000). However, this study moves beyond utilitarian aspects to emphasize perceived enjoyment and stress reduction as critical psychological factors influencing user behavior. This broader focus helps to bridge gaps in existing research by integrating insights from service and technology innovation within the relatively new context of Chat-GPT with augmented reality applications in tourism. By synthesizing insights from McLean and Wilson (2019) emphasized the role of vividness and interactivity in Chat-GPT with augmented reality adoption, this research highlights how perceived enjoyment enhances emotional engagement, fostering a positive attitude toward Chat-GPT with augmented reality. Moreover, by examining attitude and perceived enjoyment as mediators, the study demonstrates how these variables can reduce stress associated with adopting new technologies which underline the importance of emotional engagement and hedonic motivations in shaping user acceptance of Chat-GPT with augmented reality applications (Jalil et al., 2023; Wang et al., 2022).

This research advocates for a multidisciplinary approach that accounts for the dynamic and complex patterns of consumer behavior. Using Chat-GPT with augmented reality as a case study, it examines how service and technology innovations influence the behavioral intention to use Chat-GPT with augmented reality. The findings highlight the importance of fostering positive emotional experiences, perceived enjoyment, while addressing potential stressors to optimize adoption. This contribution builds upon prior work by offering a holistic framework that combines psychological and technological dimensions to enhance user engagement and adoption in the tourism industry (Gharaibeh et al., 2021).

## 5. Conclusion

This study explored the adoption of Chat-GPT with augmented reality applications in Thailand by investigating behavioral patterns influencing their use. The findings reveal that service innovation and technology innovation exert a direct and significant impact on perceived enjoyment and attitude. Furthermore, these variables indirectly influence behavioral intention to use Chat-GPT with augmented reality applications through the mediating roles of perceived enjoyment and attitude.

At a significance level of $p < 0.001$, both perceived enjoyment and attitude were found to have a direct and substantial effect on the behavioral intention to adopt AR applications for tourism purposes. This underscores the pivotal role of intrinsic user experiences, suggesting that tourists are more inclined to engage with AR technologies based on their personal perceptions and enjoyment rather than relying on external referrals or recommendations tied to perceived enjoyment or attitude.

These findings contribute to a deeper understanding of how service and technology innovations influence user behavior in tourism and emphasize the need for a focus on enhancing user-centric experiences to drive technology adoption.

### Limitations and future research

This research has several limitations. First, instead of focusing on a specific device or application, this study utilized general AR-based applications for tourism. Future research would benefit from exploring travelers' preferences and acceptance of various AR devices and applications. Additionally, it is recommended that studies investigate which types of AR devices or applications travelers are most interested in adopting.

The scope of this study was limited to the overall tourism context. Future research should focus on evaluating user acceptance of Chat-GPT with augmented reality applications within specific sectors, such as the hospitality and tourism industries, to better understand AR adoption and preferences. Further investigation into the role of Chat-GPT with augmented reality applications in the hospitality industry and their interaction with the broader tourism sector is strongly encouraged.

Given the novelty of Chat-GPT with augmented reality technology, further studies are necessary to reexamine the conceptual model proposed in this research, ensuring its applicability and robustness in different contexts. While this study used attitude and perceived enjoyment as mediators, future research should include moderating variables to provide a more comprehensive understanding of their effects on AR adoption. This would enrich the theoretical framework and enhance insights into the behavioral drivers of Chat-GPT with augmented reality usage in tourism.

**Conflict of interest:** The author declares no conflict of interest.

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