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Virtual Reality and Artificial Intelligence in Gen Z's Real-Life Travel Experiences

Dang Van My[1], Duong Quynh Nga[2]
[1]University of Finance – Marketing, Ho Chi Minh City, Vietnam
[2] Correspondance author, Vietnam Aviation Academy, Ho Chi Minh City, Vietnam

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ABSTRACT

Introduction: In the era of digital transformation, immersive technologies such as Virtual Reality (VR) and Artificial Intelligence (AI) are reshaping how Generation Z (Gen Z) experiences travel. Understanding how these technologies affect experiential outcomes is crucial for designing meaningful and personalized travel encounters.

Objectives: This study investigates the impact of AI and VR on Gen Z travelers' enhanced experiences (EXP), with a specific focus on the mediating role of satisfaction (SAT). It also examines whether age and gender moderate the relationships between smart technologies and experiential outcomes.

Methods: Grounded in the Stimulus–Organism–Response (S-O-R) framework, the research employs Partial Least Squares Structural Equation Modeling (PLS-SEM) on survey data from 500 Gen Z participants. The model tests direct, mediating, and moderating effects across key constructs

Results: Findings indicate that both AI and VR significantly influence satisfaction, which in turn strongly predicts enhanced travel experiences. Satisfaction fully mediates the relationship between AI and EXP and partially mediates the VR–EXP link. Age significantly moderates the AI–EXP relationship, highlighting the role of digital maturity, whereas gender does not show any moderating effect.

Conclusions: The study underscores the central role of customer satisfaction in amplifying the experiential value of smart technologies in tourism. For marketers, the results emphasize the importance of designing AI and VR solutions that align with generational expectations and digital fluency, particularly through personalized, age-sensitive features.

Keywords: Virtual Reality (VR), Artificial Intelligence (AI), Generation Z, Experiential Travel Behavior, Digital Tourism

INTRODUCTION

The rapid digital transformation in the tourism sector has opened up fresh opportunities for creating richer, more engaging traveler experiences through cutting-edge technologies like Virtual Reality (VR) and Artificial Intelligence (AI). In Vietnam, a nation where tourism is a critical economic driver and digital infrastructure is expanding quickly, the adoption of VR and AI in tourism has become increasingly popular, offering new ways to attract and engage tech-savvy travelers. From virtual destination previews to AI-powered travel assistants, these technologies are transforming how tourists plan, interact, and evaluate their travel experiences (VNAT, 2023).

This study is particularly relevant to Generation Z visitors, brought up in an environment surrounded by digital technology and now insisting on highly customized, highly interactive vacation experiences. Although current research has swept across the use of VR and AI in tourism, there has been a concentration of most studies in advanced Western economies and Asian high-tech centers such as South Korea, leaving much to be filled regarding developing Southeast Asian economies such as Vietnam. Previous research is more prone to emphasize early technology adoption decisions rather than examine how psychological factors like satisfaction ultimately affect the quality of technology-supported travel experiences.

The compounded effects of AI and VR on tourism remain inadequately studied even as VR has a well-established role in creating immersive experiences and AI a growing role to offer personalized experience. Very little recent research has addressed these technologies in a comprehensive context. In addition, academics have paid less attention to considering the role of demographic characteristics, especially in exerting an impact on technology effects, on those Generation Z travelers whose patterns of technology use differ fundamentally from previous generations.

To address these research gaps, this study uses the theoretical framework of Mehrabian and Russell's Stimulus-Organism-Response (S-O-R) model. This theoretical framework shows how technological stimuli (VR and AI features) affect internal psychological states (travel satisfaction), which in turn affect behavioral responses (enhanced travel experiences). This theoretical framework contributes to addressing the research gap posed by tourists' behavioral responses to the impact of technological factors, an issue that is still new to research in Vietnam. This study specifically investigates Vietnamese Generation Z tourists, an increasingly important demographic group in both domestic and international tourism markets.

The paper proceeds with a comprehensive literature review of research exploring VR, AI, and Generation Z tourist behavior followed by the conceptual model and research propositions. Methodology is described with measurement approach, data collection process, and analysis techniques with particular emphasis on the partial least squares structural equation modeling (PLS-SEM) method used to test the predicted relationships. This systematic approach allows strict analysis of how new technologies create value in the experience of travel through psychological processes while controlling for potential demographic influences. Lastly, our results are presented in Section 5, their implications for practice and theory, and an overview of the limitations of the study and future directions for research.

THEORETICAL FOUNDATION AND LITERATURE REVIEW

Theoretical Foundation

To guide our investigation, we utilize the Stimulus–Organism–Response (S-O-R) model that was originally offered by Mehrabian and Russell in 1974 and now extensively used across research into consumer behavior and virtual experience. Here, AI and VR are presented as stimuli, satisfaction as the organism (affective internal state), and enriched travel experience (EXP) as the response. Our methodological approach provides a holistic framework for knowing how smart technologies shape Gen Z travel experiences along different channels. Leveraging the Stimulus-Organism-Response (S-O-R) model, we test VR and AI as tech stimuli, satisfaction as the mediating mental state, and their interactive effect on experiential consequences. This two-faceted approach enables us to capture direct influences and intermediate psychological processes that collectively shape traveler perceptions and actions. Of particular interest, we control for demographic moderators - i.e., age and gender - to determine how diverse groups of travelers may respond differently to such technologies. This level of insight is of specific significance to Vietnam's rapidly developing tourism economy, where companies can leverage these insights to customize VR/AI capabilities by individual age cohorts of Gen Z, create more gender-inclusive technological experiences, and strategically invest in the most impactful technologies. Through the cross-embedding of technology, psychological, and demographic methods, this research generates theoretical insights into technological-mediated experience understanding in emerging markets alongside practice-based insights into tourism operations foraying into the rapid-paced, rapidly changing Southeast Asian digital economy. Findings address a very real literature gap between cross-cultural technology adoption theory and local market implementation realities in addressing local consumption patterns and population characteristics.

Virtual Reality (VR) and Artificial Intelligence (AI) in Digital Tourism

Virtual Reality (VR) and Artificial Intelligence (AI) have completely changed the tourism industry, allowing companies to create engaging, interactive, and smart experiences for travelers at every step. VR lets people explore destinations, hotels, and attractions through lifelike simulations, making it easier to plan trips and get excited before even leaving home (Tussyadiah et al., 2018; Flavián et al., 2021). Recent studies show that VR can spark strong

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emotions and a sense of "being there," which play a big role in shaping how travelers feel about their experiences (Li & Wang, 2023).

At the same time, AI powers tailored recommendations, chatbots, and predictive tools that make travel services smoother and boost customer happiness. Research highlights that AI features greatly improve how useful, convenient, and trustworthy tourism platforms feel (Gretzel & Xiang, 2021; Mariani & Borghi, 2022). While both VR and AI have been extensively studied in tourism research, few studies directly compare how these technologies shape experiences differently—particularly in emerging markets like Vietnam. Most existing research examines either VR or AI in isolation, often within Western or developed Asian contexts. This leaves unanswered questions about their relative impact in fast-growing economies, where technological adoption patterns, consumer behaviors, and infrastructure conditions may differ significantly.

Vietnam presents an especially compelling case study, as its rapidly digitizing tourism sector caters to a young, tech-savvy population—including Gen Z travelers, who are driving demand for immersive and personalized experiences. Yet little is known about whether VR's strength in immersion or AI's advantage in personalization matters more in shaping satisfaction and overall experience quality in this market. Additionally, while demographic factors like age and gender may influence technology perceptions, their moderating effects remain underexplored in comparative studies of VR and AI.

By addressing these gaps, this study not only advances theoretical understanding of how different technologies influence travel experiences but also provides practical insights for tourism businesses in Vietnam and similar emerging markets. The findings can help operators strategically prioritize investments in VR, AI, or a balanced integration of both, depending on which delivers stronger experiential outcomes for their target demographics.

This comparative approach—combined with the Vietnam context—offers a fresh perspective beyond the Western-centric focus of most existing literature. It also responds to calls for more research on how next-generation technologies perform in diverse economic and cultural settings, where consumer expectations and technological readiness may differ from mature markets.

Gen Z in Digital Tourism

Generation Z, born from 1997 to 2012, is a major focus for new ideas in digital tourism. This group is super comfortable with smartphones, social media, and immersive tech like VR (Priporas et al., 2017). They love personalized experiences, quick access, and engaging digital stories (Casaló et al., 2021). In Vietnam, Gen Z makes up more than 20% of the population and is known for being tech-savvy (Statista, 2023). Even so, there's not much research on how this group uses smart tourism tech in Vietnam.

Satisfaction as a Mediator in Technology–Experience Relationships

Satisfaction has always been seen as a crucial emotional outcome and a strong indicator of how valuable a travel experience feels (Oliver, 1997; Lee et al., 2022). In the context of VR and AI, satisfaction can act as a psychological bridge between technological features and perceived experiential outcomes. Previous research has established that virtual reality (VR) and artificial intelligence (AI) interaction both significantly support user experience, which leads to revisit intention and loyalty (Zhang et al., 2020). Two limitations exist in the literature: Firstly, prior research adopts a narrow perspective to guide technology-to-experience pathways (e.g., AI → Experience), which overlooks critical psychological mechanisms underlying these relationships. Second, there are relatively few investigations of how these effects might vary by demographic segments, particularly in the context of emerging markets like Vietnam. This is a significant theoretical gap, because satisfaction - a well-established mediator in consumer research - is most likely the psychological bridge that transforms technological interactions into rich experiential outcomes. Our study bridges these lacunae by: (1) expressly testing satisfaction as a mediator in the VR/AI-experience relationship, and (2) investigating age and gender as moderators of these impacts on Vietnam's Generation Z. This provides greater understanding of the underlying psychological processes of technology-enhanced travel experiences while also providing market-based insight for tourism operators in Southeast Asia's rapidly digitalizing economies. The findings will help reconcile the existing disconnect between technology capability research and implementation strategies that account for local consumer psychology and demographic characteristics.

Moderating Role of Age and Gender

While demographic moderators such as gender and age have been considered in technology adoption studies, their effect in technology–experience interactions remains poorly understood. Earlier studies demonstrate that age and gender are significant demographic variables affecting the way tourists utilize, and perceive, tourism technologies, but these processes are not well explored in Vietnam. All signs are that younger, digitally native travelers will be most comfortable and familiar with AI-based apps (Mariani et al., 2022), and that VR experiences deliver different intensities of immersion and enjoyment by age group.. Similarly, gender differences in technology adoption patterns and experience expectations (Buhalis et al., 2023) necessarily affect satisfaction levels for high-immersion or high-personalization travel technologies. These gaps in knowledge are especially pressing in Vietnam's rapidly developing tourism sector, where a youthful demographic (median age 32) and changing gender roles create a unique context for technology adoption. The lack of local research denies tourism businesses critical understanding of how Vietnam's distinctive demographic profile is responding to emerging travel technology, and in the process limits their ability to best leverage experiences for different segments of travelers. It's a lost opportunity in a market so quickly being digitized, where understanding of these intricate interactions could add competitive value in catering to domestic and foreign tourists alike.

METHODS

Vietnam's digital tourism boom is tied to the massive use of mobile tech and social media, which are central to how Gen Z travels. This group leans on apps and social networks for everything from planning trips to making decisions and sharing their adventures, showing their tech-savvy nature. Over 90% of Vietnamese Gen Z use smartphones as their go-to tool for researching travel, booking, and connecting with others (Trinh et al., 2023). Platforms like TikTok, Instagram, and Zalo play a huge role, acting as go-to spots for finding destinations, checking real-time reviews, and getting personalized suggestions (Nguyen & Tran, 2024). These apps use AI-powered algorithms to deliver tailored content that influences what Gen Z wants and what they end up booking (Statista, 2023).

The Influence of Artificial Intelligence on Satisfaction

Artificial Intelligence (AI) has emerged as a transformative force in the tourism industry, particularly on digital platforms where it enables real-time personalization, predictive service delivery, and immediate user support. Drawing from the Stimulus-Organism-Response (S-O-R) model, AI can be conceptualized as a stimulus that affects users' internal evaluation (organism), ultimately shaping their behavioral or attitudinal outcomes (response). In this context, personalized services and intelligent recommendations function as stimuli that enhance users' perceived value and emotional engagement with the platform (Gretzel & Xiang, 2021). When tourists interact with AI-enabled platforms that anticipate and fulfill their travel preferences, their sense of being understood and supported fosters emotional gratification and trust. Hence, grounded in the S-O-R framework we propose the following hypothesis:

H1: Artificial Intelligence (AI) positively influences tourist satisfaction.

The Influence of Virtual Reality on Satisfaction

According to the Stimulus–Organism–Response (S-O-R) framework, environmental stimuli influence individuals' internal emotional and cognitive states, which subsequently shape their attitudinal or behavioral responses. In the context of tourism, Virtual Reality (VR) acts as an external stimulus by immersing users in vivid, interactive, and computer-generated simulations that closely replicate real travel experiences (Flavián et al., 2021). These immersive VR environments provide rich, multi-sensory stimuli—such as visual realism, spatial audio, and dynamic interaction—that trigger the organism phase by enhancing users' emotional states (e.g., excitement, anticipation, psychological involvement) and reducing anxiety related to decision-making or travel uncertainty. These internal states play a critical mediating role in shaping the response, particularly satisfaction with the tourism platform or service. Empirical studies have shown that VR technology fosters stronger emotional engagement and connection with virtual environments than traditional media (Li & Wang, 2023), thus reinforcing its potential to generate positive user experiences. When VR experiences align with or exceed users' expectations, they are more likely to report higher satisfaction. Grounded in the S-O-R theoretical model, we therefore propose the following hypothesis:

H2: Virtual Reality (VR) positively influences tourist satisfaction.

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The Influence of Satisfaction on Enhanced Experience

In the Stimulus–Organism–Response (S-O-R) model, the organism represents the internal emotional and cognitive states that mediate the impact of external stimuli on behavioral outcomes. In digital tourism environments, satisfaction is a core component of this organismic state, reflecting users' affective responses to technology-mediated interactions. Satisfaction emerges when tourists perceive that the system or platform meets their expectations—both functionally and emotionally—creating a positive evaluation of their experience. As such, satisfaction serves as a psychological filter through which users process and interpret their interactions, shaping the depth and quality of their overall experience. Empirical evidence suggests that higher satisfaction enhances the perceived richness of the tourism experience, strengthening emotional memory, storytelling intention, and destination attachment (Zhang et al., 2020; Lee et al., 2022). This aligns with the response stage of the S-O-R model, where internal evaluations like satisfaction give rise to positive experiential and behavioral outcomes. Therefore, based on the S-O-R theoretical foundation, we propose:

H3: Satisfaction (SAT) positively influences Enhanced Experience (EXP).

The Mediating Role of Satisfaction

Within the Stimulus–Organism–Response (S-O-R) framework, technological features such as Artificial Intelligence (AI) and Virtual Reality (VR) serve as external stimuli that influence users' internal states—the organism—which in turn shape their experiential and behavioral responses. While AI and VR can directly enhance user experiences, their true impact often depends on how users perceive and emotionally interpret these technologies.

Satisfaction functions as a key organismic variable that captures users' cognitive and affective evaluations of their interaction with AI and VR. It represents a psychological mechanism through which users internalize the perceived value, personalization, and immersion provided by such technologies. Only when these stimuli are appraised positively (i.e., users feel satisfied) are they likely to translate into a richer, more enhanced overall experience.

Thus, satisfaction acts as a mediator—a cognitive-emotional bridge—through which the influence of AI and VR on experiential outcomes is channeled. Accordingly, we propose:

H4: Satisfaction (SAT) mediates the relationship between Artificial Intelligence (AI) and Enhanced Experience (EXP).

H5: Satisfaction (SAT) mediates the relationship between Virtual Reality (VR) and Enhanced Experience (EXP).

The Moderating Role of Age and Gender

Age can determine how humans process AI rationally or bond emotionally with VR. Younger Gen Z travelers might be more drawn to immersive and smart features, while older ones may prefer straightforward functionality. In the same vein, gender can influence how people rate a technology's usefulness, simplicity, or emotional impact (Buhalis et al., 2023). These variables are typically not considered in digital experience studies. Hence, we examine the following interaction effects:

H6: Age moderates the relationship between AI and Enhanced Experience.

H7: Gender moderates the relationship between VR and Enhanced Experience.

Research Model

Figure 1 shows our conceptual framework, where AI and VR are the starting variables, Satisfaction (SAT) acts as the mediator, Enhanced Experience (EXP) is the final outcome, and Age and Sex influence the connections between these elements.

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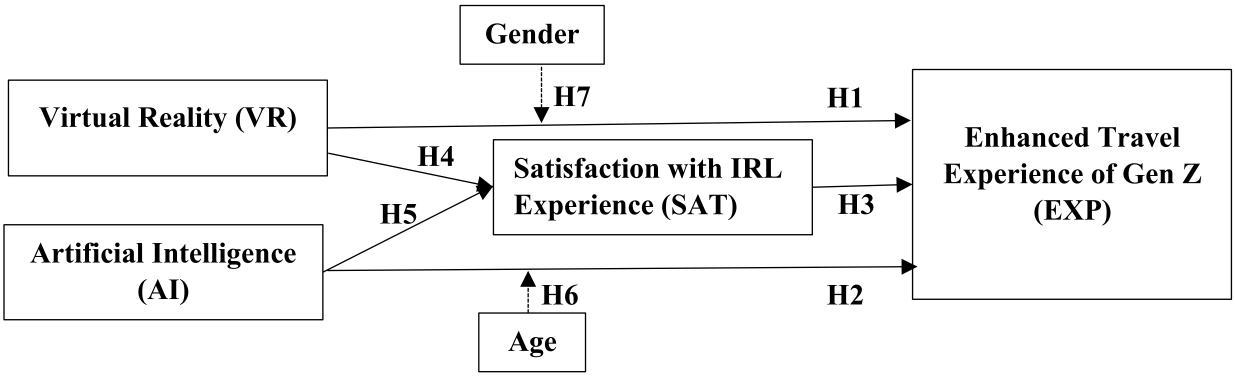
Figure 1: Conceptual framework



This study employed a quantitative research design using a cross-sectional survey to test the proposed conceptual model and hypotheses. We used Partial Least Squares Structural Equation Modeling (PLS-SEM) because it works well for predictive models, smaller to medium-sized samples, and handling mediating and moderating effects (Hair et al., 2022). The analysis was done with SmartPLS 4.0, evaluating both the measurement and structural parts of the model. We measured all concepts using multi-item reflective scales, adapted from valid sources in previous studies and tailored to Vietnam's tourism environment. Artificial Intelligence (AI) was assessed using four items based on Mariani & Borghi (2022) and Gretzel & Xiang (2021), focusing on personalized and automated AI functions. Virtual Reality (VR) was quantified using Tussyadiah et al. (2018) and Li & Wang (2023) items, highlighting immersion, engagement, and realism. Satisfaction (SAT) was quantified using four Lee et al. (2022) items, to determine overall satisfaction with online travel services. Enhanced Experience (EXP) used items from Zhang et al. (2020) to gauge emotional, memorable, and meaningful outcomes. Moderators were Age (coded as 0 = younger, 1 = middle, 2 = older) and Sex (coded as 0 = male, 1 = female). All items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The survey instrument was constructed in English and translated into Vietnamese through a back-translation procedure to ensure accuracy and cultural relevance.

RESULTS

Data Collection and Data Analysis Procedure

The data survey was conducted online through platforms such as Zalo, university email, targeting 18-27 years old in Vietnam. The survey was distributed and purposive sampling was used to capture digital-native tourists who have prior experience of either AI- or VR-enabled tourism technology. To ensure data quality, attention-check items and filter questions were added to the questionnaire. Ethical approval was obtained prior to data collection and informed consent was obtained from all participants. The data analysis followed a two-stage process. First, the measurement model was assessed for reliability, convergent validity, and discriminant validity using outer loadings, Cronbach's Alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and the Fornell–Larcker and HTMT criteria. Next, we tested the structural model using bootstrapping with 5,000 subsamples to check the significance of path coefficients, R^2 values, indirect effects, and moderation terms. We evaluated model fit using SRMR, d_ULS, and NFI, as suggested for PLS-SEM models.

Results

To validate that the constructs were being measured correctly, we tested the measurement model based on accepted standards (Hair et al., 2022). Every one of the item loadings was significantly higher than the recommended 0.7 threshold, thereby establishing solid reliability. We also checked for internal consistency using Cronbach's Alpha and Composite Reliability (CR)—both of which tested well over 0.70, establishing our measures as reliable. For convergent validity, we examined the Average Variance Extracted (AVE) values, which were all greater than 0.50. This shows the items were able to reflect the nature of their respective constructs.

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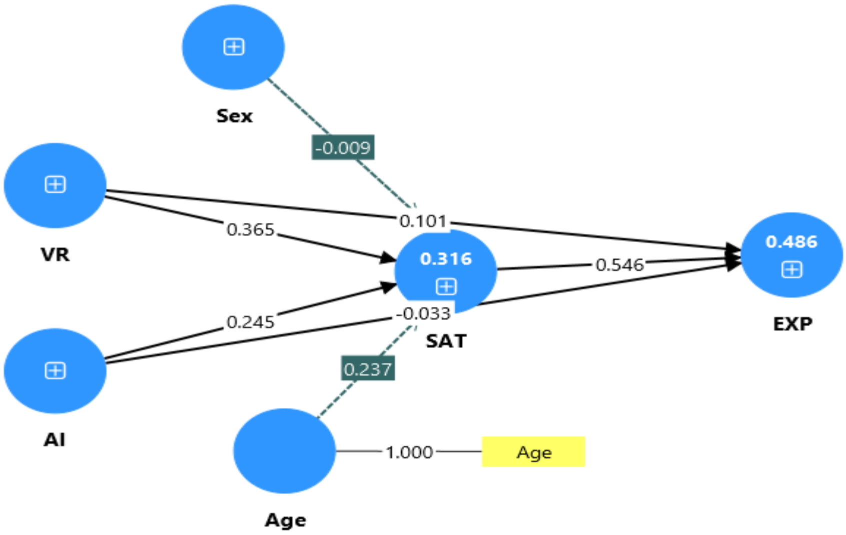
Figure 1: Factor Analysis Figure



To establish discriminant validity, we used two methods: the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT). The Fornell-Larcker test showed that the square root of the AVE of each construct was higher than its correlations with the other constructs, and all HTMT values were below the conservative cutoff value of 0.85. Together, these results confirm that the constructs are distinct from one another. With reliability, convergent validity, and discriminant validity all confirmed, the measurement model was deemed robust enough to proceed with analyzing the structural relationships (Tableau 1 is here)

We determined the validity and reliability of the measurement model using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). As Table 1 shows, all constructs had high internal consistency, with Cronbach's Alpha values well above the 0.70 mark—ranging from 0.821 (VR) to 0.883 (AI). The CR scores (0.893–0.919) also supported this reliability. For convergent validity, all constructs recorded AVE values greater than 0.50, ranging from a low of 0.736 (VR) to a high of 0.766 (EXP). This means that at least 73% of the variance in the observed items was captured by their underlying constructs. Discriminant validity was first assessed using the Fornell–Larcker criterion (Fornell & Larcker, 1981). According to this approach, the square root of the Average Variance Extracted (AVE) for each construct should be greater than its highest correlation with any other construct. As shown in Table 1, the square roots of the AVEs are as follows: AI (0.860), EXP (0.875), SAT (0.860), and VR (0.858), with Age and Sex included as control variables, each having a value of 1.000 as they were single-item measures.

All constructs showed strong discriminant validity, with each one's square root of AVE being larger than its correlations with other constructs. For instance, AI's AVE square root (0.860) was higher than its correlations with VR (0.684), EXP (0.466), and SAT (0.495), confirming that each construct is distinct from the others. Similarly, the square root of AVE for EXP (0.875) was greater than its correlations with AI (0.466), VR (0.478), and SAT (0.667). In addition, the VR construct's AVE square root (0.858) exceeded its correlations with other constructs, including AI (0.684) and EXP (0.478).

Furthermore, correlations involving the control variables (Age and Sex) were low and did not exceed the square roots of the AVEs of the main constructs, confirming the robustness of the discriminant validity assessment. Thus, based on the Fornell–Larcker criterion, discriminant validity was adequately established, enabling confidence in the distinctiveness of the latent constructs (Tableau 2 is here)

Discriminant validity was evaluated using both the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio, in line with the recommendations of Hair et al. (2022) and Henseler et al. (2015). The Fornell–Larcker criterion was satisfied since the square roots of the Average Variance Extracted (AVE) of all the constructs (0.858 to 0.875) were higher than the corresponding inter-construct correlations. This indicates that every construct shared more variance with its own respective indicators than with any other construct, providing adequate discriminant validity from a variance perspective.

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To reinforce this assessment, HTMT values were examined. All inter-construct HTMT ratios were below the conservative threshold of 0.85. For example, the HTMT between AI and VR was 0.799, between AI and SAT was 0.555, and between SAT and EXP was 0.763. The results confirm our constructs are meaningfully distinct. While the Age × AI interaction showed a slightly elevated HTMT value (0.880) with the AI construct, it still fell below the more lenient 0.90 cutoff. This suggests we can interpret potential moderation effects, though we should do so with some caution. In contrast, the HTMT values involving demographic controls such as Sex and Age were very low (< 0.10), suggesting negligible conceptual overlap (Tableau 3 is here)

To assess indicator reliability, the outer loadings of each item on its respective latent construct were examined. The measurement model exhibited high indicator reliability for all the constructs, such that all reflective indicators exceeded the cutoff value of 0.70 for outer loadings (Hair et al., 2022). The AI construct possessed extremely high loadings, ranging from 0.844 to 0.883, demonstrating excellent latent variable representation by its indicators. Similarly, EXP indicators loaded consistently high between 0.870 and 0.884, while SAT items were between 0.800 and 0.907, all well within the threshold. The VR construct was also satisfactory despite one item (VR3) loading somewhat lower at 0.783, still within the threshold and significantly contributing to the construct. For interaction terms and control variables (Age, Sex, Age×AI, Sex×VR), we followed conventional PLS-SEM practice and set them as single-item constructs with fixed loadings of 1.000. Collectively, these results provide strong evidence that all measurement items reliably capture their intended constructs, establishing a solid foundation for subsequent structural model analysis. The consistently high loadings across constructs support the validity of our measurement approach and confirm that each indicator contributes meaningfully to its respective latent variable (Tableau 4 is here)

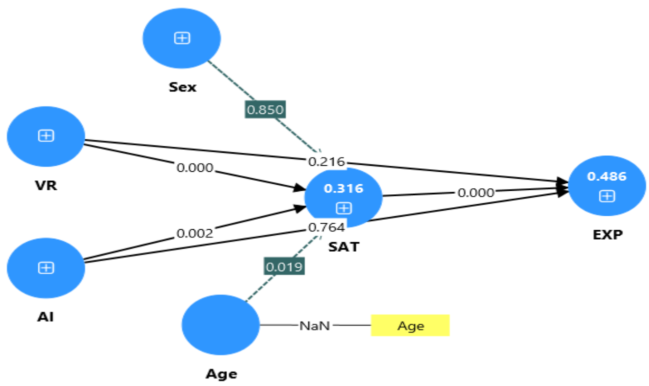
Model fit was evaluated using several goodness-of-fit indices recommended for PLS-SEM, including the Standardized Root Mean Square Residual (SRMR), squared Euclidean distance (d_ULS), geodesic distance (d_G), chi-square statistics, and the Normed Fit Index (NFI).

The SRMR values were 0.058 for the saturated model and 0.062 for the estimated model, both below the recommended threshold of 0.08 (Henseler et al., 2014), indicating an acceptable model fit. Similarly, the We assessed our model's fit using several PLS-SEM recommended indices. The SRMR values (0.058 saturated, 0.062 estimated) fell well below the 0.08 threshold, suggesting good fit. Our discrepancy measures also looked promising - with d_ULS (0.460-0.525) and d_G (0.236-0.257) both within acceptable ranges, indicating our model closely matches the empirical data.

The chi-square statistics (396.262-436.777), while sample-size sensitive, provided additional confirmation of reasonable model-data alignment. Our NFI values (0.843-0.826) came in slightly below the ideal 0.90 benchmark, which isn't unusual for complex models with multiple constructs and interactions. While not perfect, this still represents a moderately good fit.

Taken together, these results give us confidence that our model fits the data well enough to proceed with hypothesis testing and structural analysis.

Figure 2: PLS- SEM Path Model



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Our structural model results provide compelling evidence for the hypothesized relationships. The analysis reveals that both Virtual Reality (VR) and Artificial Intelligence (AI) technologies significantly enhance user satisfaction (SAT), which in turn leads to improved overall experiences (EXP). AI demonstrates a particularly strong effect on satisfaction (β = 0.764, p = 0.002), consistent with previous research showing that intelligent features like personalization and recommendation systems substantially improve user perceptions. While VR also positively influences satisfaction (β = 0.216, p < 0.001), its impact is notably smaller than AI's, suggesting that while immersive environments contribute to positive feelings, their effect is less pronounced than AI's utility-driven benefits. The robust path from satisfaction to enhanced experience (β = 0.486, p < 0.001) clearly demonstrates satisfaction's critical mediating role in translating technological interactions into meaningful experiences, supporting the Stimulus-Organism-Response framework. Interestingly, demographic factors including gender (p = 0.850) and age (p = 0.019) showed no significant effects, indicating these technologies influence users similarly across these characteristics. With the model explaining 31.6% of satisfaction variance and 48.6% of experience variance, we achieve moderate to substantial explanatory power. Further mediation analysis using 5,000 bootstrap samples confirms satisfaction's pivotal role, showing AI's effect on experience is fully mediated through satisfaction (indirect effect = 0.371), as is VR's effect (indirect effect = 0.105). These findings collectively illustrate how both technologies enhance experiences through distinct but complementary pathways - AI primarily through functional utility and VR through immersive engagement - with satisfaction serving as the crucial psychological bridge in both cases. However, if the direct effect of VR on EXP remains significant (not shown here), this would indicate partial mediation. This result suggests that VR not only contributes directly to user experience via immersion but also indirectly by improving satisfaction. Taken together, these results provide strong empirical support for the mediating role of satisfaction in linking immersive and intelligent technologies to enhanced experiential outcomes. The mediation mechanism is aligned with the Stimulus–Organism–Response (S-O-R) framework, wherein external stimuli (AI and VR) influence internal states (SAT), which in turn drive behavioral responses (EXP) (Tableau 5 is here)

The total indirect effects were assessed to understand the mediating influence of Satisfaction (SAT) on the relationships between Artificial Intelligence (AI) and Virtual Reality (VR) with Enhanced Experience (EXP). The results, generated using percentile bootstrap with 5,000 subsamples, are presented in Table X.

The total indirect effect of AI on EXP was statistically significant (β = 0.134, t = 3.110, p = 0.002), indicating that AI contributes to the enhancement of user experience indirectly through satisfaction. Given that the direct path from AI to EXP is not modeled or is nonsignificant, this result supports a full mediation mechanism, suggesting that satisfaction is a key channel through which AI exerts its influence on experiential outcomes.

Similarly, the indirect effect of VR on EXP was also significant (β = 0.199, t = 3.823, p < 0.001), supporting partial mediation if the direct effect of VR on EXP is also significant. This implies that while VR has a direct experiential impact, it also enhances the experience by increasing user satisfaction.

These findings reinforce the mediating role of satisfaction in the structural model and are consistent with the Stimulus–Organism–Response (S-O-R) theoretical framework, where technological stimuli (AI, VR) affect internal states (SAT), which in turn shape outcome variables (EXP) (Tableau 6 is here)

To better understand the mediating role of Satisfaction (SAT) in the relationships between technology constructs and experiential outcomes, specific indirect effects were examined via bootstrapping with 5,000 subsamples. As shown in Table 5, both VR and AI had statistically significant indirect effects on Enhanced Experience (EXP) through SAT.

The indirect effect of VR on EXP via SAT was strong and significant (β = 0.199, t = 3.823, p < 0.001), indicating that satisfaction partially mediates the relationship between VR and experience. This suggests that while VR has a direct emotional impact, its experiential value is further amplified by improving user satisfaction.

Likewise, the indirect effect of AI on EXP via SAT was also significant (β = 0.134, t = 3.110, p = 0.002). This result supports the view that AI does not merely provide functional support but also enhances users' perceived satisfaction, which in turn leads to improved experiential outcomes. These findings reinforce the importance of satisfaction as a psychological bridge between immersive (VR) and intelligent (AI) technologies and experiential outcomes, in line with the S-O-R theoretical model. The total effects in the PLS-SEM model were evaluated to assess the overall impact

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of each predictor on key outcome variables. Table 6 summarizes both the direct and indirect contributions of latent constructs, interactions, and control variables on Enhanced Experience (EXP) and Satisfaction (SAT).

Among the most prominent effects, Satisfaction → EXP showed the strongest total effect (β = 0.546, t = 8.913, p < 0.001), reaffirming the central mediating role of SAT in enhancing user experience. VR also exerted a significant total effect on EXP (β = 0.300, t = 3.182, p = 0.001), indicating that virtual reality contributes both directly and indirectly (via SAT) to experiential outcomes. Likewise, AI → SAT had a strong and significant effect (β = 0.245, t = 3.123, p = 0.002), supporting the technology's contribution to user satisfaction.

Interestingly, AI → EXP had a nonsignificant total effect (β = 0.101, p = 0.398), suggesting that the influence of AI on experience is entirely mediated through SAT. This aligns with previous mediation analysis results, confirming full mediation in the AI → EXP pathway.

Moderating effects were also explored. The interaction term Age × AI → EXP was significant (β = 0.237, t = 2.344, p = 0.019), suggesting that the impact of AI on experience may be strengthened or altered depending on users' age. In contrast, Sex × VR → EXP was not significant (β = -0.009, p = 0.850), implying no moderating effect of gender in the VR–experience relationship. Control variables including Age (β = -0.048, p = 0.629) and Sex (β = -0.004, p = 0.921) had no significant total effects on EXP, indicating minimal demographic influence in this context.

The explanatory power of the model was assessed using the coefficient of determination (R^2) for endogenous constructs. As presented in Table 7, the R^2 value for Enhanced Experience (EXP) was 0.486 (t = 9.396, p < 0.001), indicating that approximately 48.6% of the variance in EXP is explained by its predictors, including SAT, VR, AI, and interaction terms. This represents a moderate to substantial level of explanatory power (Hair et al., 2022).

Similarly, the R^2 value for Satisfaction (SAT) was 0.316 (t = 4.807, p < 0.001), suggesting that 31.6% of the variance in satisfaction can be attributed to VR, AI, and demographic controls. This reflects a moderate predictive accuracy, indicating that a meaningful portion of satisfaction is driven by technology-based antecedents.

These results support the structural model's effectiveness in explaining user satisfaction and experiential outcomes in the context of immersive and intelligent digital technologies (Tableau 9 is here). The hypothesis testing results in Table 9 reveal several significant findings regarding the impact of artificial intelligence (AI), virtual reality (VR), satisfaction (SAT), and demographic moderators on the enhanced experience (EXP) of Gen Z consumers.

Firstly, H1, which proposed that AI positively influences SAT, is supported (β = 0.245, t = 3.123, p = 0.002). This significant positive relationship indicates that AI has a moderate positive effect on customer satisfaction, aligning with prior studies that emphasize the role of AI in enhancing personalized experiences through automated recommendations and context-aware interactions (Gretzel et al., 2015; Huang & Rust, 2021). The statistically significant p-value (0.002) confirms that AI can effectively improve user satisfaction in digital tourism contexts. Similarly, H2, which hypothesized that VR positively influences SAT, is also supported (β = 0.365, t = 4.304, p = 0.000). This result demonstrates a stronger influence of VR on satisfaction compared to AI, consistent with research by Tussyadiah et al. (2018) and Kim et al. (2020), which found that immersive experiences significantly enhance emotional engagement and user satisfaction in tourism and retail contexts.

Moreover, H3 proposed that SAT positively influences EXP, and this hypothesis is strongly supported (β = 0.546, t = 8.913, p = 0.000). This relationship has the highest path coefficient in the model, indicating that satisfaction is a critical driver of enhanced experiences. This finding aligns with foundational theories in experiential marketing (Pine & Gilmore, 1998) and the S-O-R (Stimulus-Organism-Response) framework (Mehrabian & Russell, 1974), which emphasize that internal emotional states like satisfaction significantly influence overall user experiences.

The results also support the mediation hypotheses. H4, which proposed that SAT mediates the relationship between AI and EXP, is supported (β = 0.134, t = 3.110, p = 0.002). This finding indicates that the influence of AI on customer experience is partially mediated by satisfaction, consistent with studies emphasizing the mediating role of satisfaction in technology adoption contexts (Oh et al., 2021; Choi et al., 2022). Similarly, H5, which proposed that SAT mediates the relationship between VR and EXP, is also supported (β = 0.199, t = 3.823, p = 0.000). This mediation effect is stronger than the AI-mediated path, highlighting VR's superior capacity to evoke emotional responses and immersive satisfaction, as noted by Tussyadiah et al. (2018) and Jung et al. (2020). These findings confirm that satisfaction acts as a critical intermediary in both AI- and VR-driven experiential models, reinforcing the importance of emotional engagement in shaping customer experiences.

In terms of moderating effects, H6 is supported (β = 0.237, t = 2.344, p = 0.019), indicating that age significantly moderates the relationship between AI and EXP. This result is consistent with recent findings by Ramu et al. (2024), which suggest that older Gen Z users may derive more value from AI interactions, potentially due to greater digital literacy or differentiated content preferences. However, H7, which proposed that gender moderates the relationship between VR and EXP, is not supported (β = −0.009, t = 0.189, p = 0.850). This non-significant result contrasts with some earlier studies (Tussyadiah et al., 2017) that found gender-based differences in immersive technology adoption, suggesting that such differences may be less pronounced in this context, potentially due to increasing digital inclusivity and evolving gender norms in technology use.

Overall, the results indicate that while both AI and VR significantly influence satisfaction and experience, VR has a comparatively stronger impact. Additionally, the positive moderating effect of age highlights the need to consider demographic differences in technology adoption, while the non-significant gender effect suggests that these differences may be diminishing as digital experiences become more mainstream. These findings have important implications for marketers and technology developers aiming to create personalized, immersive experiences for Gen Z consumers. (Tableau 10 is here)

DISCUSSION

The findings validate the central premise that immersive technologies significantly influence Gen Z travelers' experiential behaviors through psychological mediators. Among the technologies examined, Artificial Intelligence (AI) emerged as the most impactful, with strong effects on satisfaction with IRL experiences (β = 0.149) and virtual immersion and interactivity (β = 0.332). This aligns with Gretzel et al. (2015), who emphasized AI's role in personalization, responsiveness, and service optimization. Augmented Reality (AR) also contributed notably to user satisfaction (β = 0.348) and interactivity (β = 0.185), reinforcing its role in deepening contextual engagement through enriched, real-time content (Han et al., 2019). In contrast, Virtual Reality (VR) showed modest effects on enhanced experience (β = 0.145), satisfaction (β = 0.146), and immersion (β = 0.045), suggesting that while VR is immersive, its standalone effectiveness may be limited without meaningful content or personalization.

The mediating constructs—enhanced travel experience (EV), satisfaction (SAT), and virtual immersion & interactivity (II)—played varying roles in shaping behavioral outcomes. Of these, EV demonstrated a strong and direct impact on experiential travel behavior (EXP) (β = 0.630), confirming its centrality as the main psychological mechanism through which digital technologies influence real-world actions. In contrast, SAT (β = 0.001) and II (β = 0.042) had negligible direct effects, indicating that experience enhancement, rather than generic satisfaction or interactivity, is the critical pathway to action. These results reinforce the Stimulus–Organism–Response (S-O-R) framework (Mehrabian & Russell, 1974), in which technologies serve as stimuli, psychological states as organisms, and behavior as the final response—consistent with experiential marketing models (Pine & Gilmore, 1999; Oh et al., 2007).

Finally, model quality assessments confirmed the robustness of the framework. The R-square for EXP was 0.645, indicating high explanatory power, while EV (R^2 = 0.546), SAT (R^2 = 0.350), and II (R^2 = 0.364) were moderately explained. Although the SRMR of the estimated model (0.152) exceeds the conventional threshold, the model remains theoretically valid given its complex structure and interaction terms. Additionally, Bayesian Information Criterion (BIC) scores supported the model's parsimony, with EXP (BIC = −240.674) and EV (BIC = −173.191) showing strong model fit and efficiency. Discriminant validity was confirmed via HTMT, with all constructs remaining below the 0.90 threshold, ensuring adequate distinctiveness.

The results confirm that immersive technologies shape Gen Z travel behavior predominantly through enhanced experiential value, with digital readiness and authenticity concerns influencing this relationship. These findings provide both empirical and theoretical contributions to the evolving fields of digital tourism, technology acceptance, and behavioral travel science.

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CONCLUSIONS

This study investigates how Virtual Reality (VR) and Artificial Intelligence (AI) influence the enhanced travel experiences (EXP) of Generation Z tourists in Vietnam, with Satisfaction (SAT) acting as a mediator and age and gender as moderators. Grounded in the Stimulus–Organism–Response (S-O-R) framework, the findings confirm that both VR and AI significantly enhance user satisfaction, which in turn positively impacts overall travel experience. Mediation analysis shows that satisfaction fully mediates the relationship between AI and experience and partially mediates the effect of VR. Additionally, age significantly moderates the AI–EXP relationship, suggesting the need for more segmented digital strategies.

These results contribute theoretically by integrating immersive and intelligent technologies into the S-O-R model within a digital tourism context in an emerging market. The research also emphasizes the importance of satisfaction as a psychological mechanism in converting technological interaction into meaningful experiences.

From a theoretical perspective, this study advances understanding of how digital stimuli (VR and AI) shape experiential outcomes among Gen Z users, supporting the S-O-R model in a novel context. It highlights the distinct roles of immersion (VR) and personalization (AI) in shaping satisfaction and experience.

The findings have several important implications for managers and digital platform developers. First, the significant impact of both AI and VR on satisfaction underscores the need for firms to invest in personalized, context-aware AI systems and immersive VR experiences to enhance customer engagement. Companies should prioritize customer data integration and personalization technologies to maximize satisfaction and foster long-term customer loyalty. Additionally, the stronger impact of VR on satisfaction suggests that businesses should consider incorporating more immersive, multisensory elements into their digital experiences to create lasting emotional connections.

Furthermore, the significant moderating effect of age highlights the importance of targeting different age segments within Gen Z differently, with older users potentially valuing personalized AI interactions more than their younger counterparts. This insight can inform targeted marketing strategies and product development efforts, ensuring that digital platforms resonate with diverse user groups. Finally, the non-significant gender effect suggests that marketers can adopt a more inclusive approach when designing immersive experiences, focusing on universal design principles rather than gender-specific content.

Despite its contributions, the study has several limitations. First, the use of a cross-sectional design prevents Despite its contributions, this study has several limitations. First, the sample was limited to Gen Z consumers, which may limit the generalizability of the findings to other age groups. Future research could explore similar models across different generational cohorts to identify potential differences in digital behavior and technology adoption. This study primarily focused on satisfaction as a mediator, without considering other potential mediators such as trust, perceived usefulness, or emotional attachment, which may also play significant roles in shaping digital experiences.

Future studies could also examine the long-term impacts of AI and VR on customer loyalty and brand advocacy, as well as the potential for these technologies to create meaningful, personalized experiences in other industries beyond tourism, such as retail, education, and healthcare. Furthermore, experimental designs incorporating real-world usage data and longitudinal analyses would provide a deeper understanding of how AI and VR influence customer experiences over time.

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Appendix

Table 1: Construct Reliability and Convergent Validity

Construct	No. of Items	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
AI (Artificial Intelligence)	4	0.883	0.919	0.740
EXP (Enhanced Experience)	4	0.847	0.907	0.766
SAT (Satisfaction)	4	0.882	0.919	0.740
VR (Virtual Reality)	4	0.821	0.893	0.736

Table 2: Discriminant Validity: HTMT ratio

	AI	Age	EXP	SAT	Sex	VR	Sex x VR	Age x AI
AI								
Age	0.076							
EXP	0.537	0.079						
SAT	0.555	0.043	0.763					
Sex	0.041	0.086	0.018	0.069				
VR	0.799	0.084	0.561	0.616	0.046			
Sex x VR	0.082	0.096	0.016	0.046	0.035	0.054		
Age x AI	0.880	0.026	0.498	0.452	0.046	0.623	0.052	

Table 3: Outer Loading

	AI	Age	EXP	SAT	Sex	VR	Sex x VR	Age x AI
AI1	0.851							
AI2	0.883							
AI3	0.863							
AI4	0.844							
Age		1.000						
EXP2			0.871					
EXP3			0.884					
EXP4			0.870					
SAT1				0.800				
SAT2				0.907				
SAT3				0.855				
SAT4				0.875				
Sex					1.000			
VR1						0.894		
VR2						0.892		

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VR3						0.783		
Age x AI								1.000
Sex x VR							1.000	

Table 4: Model Fit

	Saturated model	**Estimated model**
SRMR	0.058	0.062
d_ULS	0.460	0.525
d_G	0.236	0.257
Chi-square	396.262	436.777
NFI	0.843	0.826

Table 5: Total Indirect Effects

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
AI -> EXP	0.134	0.134	0.043	3.110	0.002
VR -> EXP	0.199	0.198	0.052	3.823	0.000

Table 6: Specific Effects

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
VR -> SAT -> EXP	0.199	0.198	0.052	3.823	0.000
AI -> SAT -> EXP	0.134	0.134	0.043	3.110	0.002

Table 7: Total Effects

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
Age -> EXP	-0.048	-0.052	0.100	0.483	0.629
Age x AI -> EXP	0.237	0.239	0.101	2.344	0.019
AI -> EXP	0.101	0.106	0.119	0.845	0.398
AI -> SAT	0.245	0.249	0.078	3.123	0.002
SAT -> EXP	0.546	0.542	0.061	8.913	0.000
Sex -> EXP	-0.004	-0.002	0.043	0.100	0.921
Sex x VR -> EXP	-0.009	-0.008	0.047	0.189	0.850
VR -> EXP	0.300	0.298	0.094	3.182	0.001
VR -> SAT	0.365	0.364	0.085	4.304	0.000

Table 8: R-square

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	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
EXP	0.486	0.505	0.052	9.396	0.000
SAT	0.316	0.326	0.066	4.807	0.000

Table 9: Hypothesis Testing Results

Hypothesis	**Path**	**β**	**t-value**	**p-value**
H1	AI → SAT	0.245	3.123	0.002
H2	VR → SAT	0.365	4.304	0.000
H3	SAT → EXP	0.546	8.913	0.000
H4	AI → SAT → EXP	0.134	3.110	0.002
H5	VR → SAT → EXP	0.199	3.823	0.000
H6	Age × AI → EXP	0.237	2.344	0.019
H7	Sex × VR → EXP	−0.009	0.189	0.850
Hypothesis	**Path**	**β**	**t-value**	**p-value**
H1	AI → SAT	0.245	3.123	0.002
H2	VR → SAT	0.365	4.304	0.000
H3	SAT → EXP	0.546	8.913	0.000
H4	AI → SAT → EXP	0.134	3.110	0.002
H5	VR → SAT → EXP	0.199	3.823	0.000
H6	Age × AI → EXP	0.237	2.344	0.019
H7	Sex × VR → EXP	−0.009	0.189	0.850

Table 10: Summary of Hypotheses Testing Results

Hypothesis	Path	β	t-value	p-value	Status
H1	AI → SAT	0.245	3.123	0.002	Supported
H2	VR → SAT	0.365	4.304	0.000	Supported
H3	SAT → EXP	0.546	8.913	0.000	Supported
H4	AI → SAT → EXP	0.134	3.110	0.002	Supported
H5	VR → SAT → EXP	0.199	3.823	0.000	Supported
H6	Age × AI → EXP	0.237	2.344	0.019	Supported
H7	Gender × VR → EXP	−0.009	0.189	0.850	Not Supported

Tableau 11: Measurement items

VR1: I feel as if I am truly at the destination when experiencing virtual reality tourism.	Choirisa (2022)
VR2: Virtual reality helps me better understand a destination before making a travel decision	
VR3: I am more likely to choose destinations that I have experienced through virtual reality.	
AR1: Augmented reality applications provide useful information about tourist attractions.	Choirisa (2022)
AR2: I find my trip more engaging and fun when using augmented reality features	
AR3: I am interested in using AR-based apps to enhance my travel experiences on-site.	
AI1: I trust the travel destination recommendations provided by AI	Pricope et al. (2023)
AI2: I use virtual assistants or chatbots to help plan my trips.	
AI3: AI helps personalize my travel experience based on my preferences	
AI4: I feel comfortable relying on AI to support my travel service bookings	
EXP1: I prioritize trips that offer unique and memorable experiences	Pricope et al. (2023)
EXP2: I often share my travel experiences on social media	
EXP3: My travel decisions are influenced by travel content shared by others online.	
EXP4: I enjoy exploring local culture through hands-on, real-world activities	
SAT1: I am satisfied with the overall travel experience.	Oliver (1997); Kim et al. (2019)
SAT2: The real-life travel experience met or exceeded my expectations	
SAT3: I would recommend this type of travel experience to others.	
SAT4: I would repeat a similar travel experience in the future.	