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From Virtual Experiences to Real Vacations: Linking Virtual Reality Headset Adoption, Pro-Environmental Behaviour, and Destination Visit Intention Among Generation Z

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ABSTRACT

Virtual reality (VR) headsets offer new opportunities for destination exploration and sustainable tourism experiences. Grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT) framework, this study examines the effects of VR headset facilitating conditions, performance expectancy, effort expectancy, and social influence on Generation Z's VR headset use intention, while investigating the mediating role of VR-induced pro-environmental behaviour in shaping destination visit intention. Data were collected through an online questionnaire from 147 Generation Z respondents with previous experience using VR headsets for tourism experiences and analysed using partial least squares structural equation modelling (PLS-SEM). The findings indicate that performance expectancy and social influence significantly increase VR headset use intention, while facilitating conditions and effort expectancy have no significant effects. VR headset use intention positively influences VR-induced pro-environmental behaviour, which subsequently increases destination visit intention. The significant indirect effect further supports the mediating role of VR-induced pro-environmental behaviour. These findings extend the UTAUT framework by linking VR headset adoption with sustainability-oriented responses and destination visit intentions, while providing practical insights for destination management organisations and tourism marketing stakeholders seeking to design immersive tourism experiences for Generation Z.

1. Introduction

Digital transformation has profoundly reshaped the tourism industry, creating new opportunities for tourist destinations to engage potential visitors through immersive technologies (Loureiro et al., 2020; Verma et al., 2022). Among these technologies, virtual reality (VR) has emerged as a promising innovation, enabling users to preview tourism experiences and explore destinations through interactive and realistic virtual environments before making travel decisions (Guttentag, 2010; Huang et al., 2013; Kasilingam et al., 2027).

Unlike conventional promotional tools, VR provides a strong sense of presence, interactivity, and emotional engagement, allowing potential tourists to experience destinations in ways that closely resemble real-world visits (Bogicevic et al., 2019; Tussyadiah et al., 2018). Consequently, destination management organizations increasingly employ VR not only to enhance destination marketing but also to improve visitor engagement and destination competitiveness (Huang et al., 2016; de Lurdes Calisto & Sarkar, 2024).

Beyond its promotional value, VR has become increasingly relevant within the sustainable tourism agenda (Peštek & Sarvan, 2020). Immersive experiences can familiarize visitors with natural and cultural heritage, reduce travel uncertainty, and encourage more responsible interactions with destinations (Nam et al., 2024). Rather than replacing physical travel, VR can complement tourism by promoting environmental awareness, supporting destination interpretation, and encouraging more sustainable travel behaviours while alleviating pressure on environmentally sensitive destinations (Guttentag, 2010). Furthermore, recent research recognizes VR as a strategic tool capable of simultaneously enhancing tourism experiences and supporting sustainable destination development (de Lurdes Calisto & Sarkar, 2024).

Generation Z represents a relevant context for investigating VR adoption in tourism, as this cohort constitutes one of the primary target segments for immersive tourism technologies and demonstrates a strong

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intention to engage with VR-based tourism experiences (Lisana et al., 2025). As digital natives, members of Generation Z exhibit high levels of technological readiness and integrate digital technologies extensively into their daily lives, including travel planning and information search (Popşa, 2024). Moreover, Generation Z increasingly values authentic and environmentally responsible tourism experiences, with environmental concern playing an important role in shaping green tourism intentions and travel behaviour (Nguyen et al., 2024).

Despite the growing body of research on VR use in tourism, several important research gaps remain. First, previous studies have primarily investigated VR from destination marketing and technology acceptance perspectives, focusing on outcomes such as telepresence, perceived usefulness, user experience, and visit intention, while comparatively less attention has been paid to broader behavioural and sustainability-related outcomes (de Lurdes Calisto & Sarkar, 2024). Second, although recent studies have started to examine the relationship between VR and sustainable tourism, empirical evidence explaining the behavioural mechanisms through which VR adoption promotes pro-environmental behaviour remains limited. Third, despite Generation Z representing one of the primary user groups for immersive technologies, studies applying the Unified Theory of Acceptance and Use of Technology (UTAUT) framework to explain VR headset adoption in tourism remain scarce, particularly when extending the model with sustainability-oriented behavioural outcomes (Lisana et al., 2025; Zhu et al., 2025).

To address these gaps, this study adopts the UTAUT framework and extends it by incorporating VR-induced pro-environmental behaviour (VRPB) as a mediating construct between VR headset use intention (VRI) and destination visit intention (DVI). The proposed conceptual model examines how Generation Z's perceptions of VR headset facilitating conditions (VRFC), performance expectancy (VRPE), effort expectancy (VREE), and social influence (VRSI) impact their intention to use VR headsets for tourism (VRI). Furthermore, the study investigates whether VR headset use intention can induce pro-environmental behaviour, which may subsequently strengthen the intention to physically visit destinations explored through VR headsets. This approach responds to the growing emphasis on extending technology-related behavioural frameworks to incorporate context-specific sustainability outcomes in tourism (Wu & Wang, 2025). Considering these facts, this study addresses the following research questions:

RQ1. How do VR headset facilitating conditions, performance expectancy, effort expectancy, and social influence impact Generation Z's intention to use VR headsets for virtual tourism experiences?

RQ2. How does the intention to use VR headsets induce pro-environmental behaviour and, subsequently, real-world destination visit intention?

2. Literature review and hypothesis development

VR headset facilitating conditions (VRFC) refer to users' perceptions that the technical infrastructure and resources required to use VR headsets are available, including access to compatible hardware, software, internet connectivity, and technical support (Venkatesh et al., 2003; Venkatesh et al., 2012). Recent extensions and empirical applications of UTAUT have further recognised facilitating conditions as an important enabling factor for behavioural intention, particularly in the context of emerging technologies that require dedicated technological infrastructure and external support (Blut et al., 2022).

In the context of VR tourism, facilitating conditions reflect Generation Z users' perceptions that they possess the technological resources required to access immersive destination experiences through VR headsets. Although Generation Z is highly familiar with digital technologies, the adoption of VR headsets still depends on the availability of appropriate equipment and technological support. Empirical studies on immersive technology adoption indicate that favourable facilitating conditions reduce technological barriers and strengthen users' intention to engage with VR experiences (Lisana et al., 2025). Therefore, the following hypothesis is proposed:

H1. *VR headset facilitating conditions have a positive effect on Generation Z's intention to use VR headsets for tourism experiences.*

VR headset effort expectancy (VREE) refers to the degree to which individuals perceive that learning and using VR headsets requires minimal effort (Venkatesh et al., 2003). Within the UTAUT framework, effort expectancy is considered a direct antecedent of behavioural intention because technologies perceived as easier to understand and operate are more likely to be accepted by users. In the context of immersive technologies, effort expectancy reflects users' perceptions regarding the simplicity of interacting with VR interfaces, navigating virtual environments, and controlling immersive applications. Previous research has consistently shown that reducing the perceived complexity of a technology enhances users' willingness to adopt it, particularly during the early stages of technology diffusion (Venkatesh et al., 2012).

In tourism, effort expectancy remains an important predictor of VR adoption because immersive experiences often involve unfamiliar devices and interaction mechanisms. VR applications characterised by intuitive navigation, clear interfaces, and straightforward interaction reduce cognitive effort and increase users' confidence in exploring virtual destinations. Recent studies have confirmed that perceived ease of use positively influences tourists' intention to engage with VR applications and supports the adoption of immersive tourism experiences (Oncioiu & Priescu, 2022; Bilynets et al., 2024). Likewise, recent UTAUT2-based research

in VR tourism demonstrates that technologies requiring less effort to operate generate stronger behavioural intentions and facilitate users' acceptance of immersive tourism applications (Mosbeh et al., 2025). Accordingly, the following hypothesis is proposed:

H2. *VR headset effort expectancy has a positive effect on Generation Z's intention to use VR headsets for tourism experiences.*

VR headset performance expectancy (VRPE) is characterized by the degree to which individuals believe that using VR headsets will enhance their tourism-related activities and improve travel decision-making (Venkatesh et al., 2012). Within the UTAUT framework, it is considered a key predictor of behavioural intention, as users are more likely to adopt technologies that provide functional value and support goal achievement. In VR tourism, these benefits include more effective destination exploration, richer pre-visit experiences, better-informed decisions, and reduced planning uncertainty (Huang, 2023). Empirical studies further confirm that tourists are more willing to adopt VR when immersive experiences offer accurate destination previews and meaningful support throughout the travel planning process, reinforcing performance expectancy as a central determinant of VR adoption (Bilynets et al., 2024; Merz et al., 2025). Considering these arguments, the following hypothesis is proposed:

H3. *VR headset performance expectancy has a positive effect on Generation Z's intention to use VR headsets for tourism experiences.*

VR headset social influence (VRSI) is defined by the extent to which individuals perceive that people who are important to them believe they should use VR headsets (Venkatesh et al., 2012). Within the UTAUT framework, social influence reflects the role of perceived social expectations in shaping behavioural intention, particularly when individuals consider adopting emerging technologies. In immersive VR contexts, recent empirical evidence confirms that social influence can strengthen users' intention to adopt VR technologies (Merz et al., 2025). This relationship is particularly relevant to Generation Z in tourism, as peer recommendations and social networks may encourage engagement with immersive technologies. Lisana et al. (2025) identified social influence as the strongest predictor of Generation Z's intention to use VR technology for tourism experiences, highlighting the role of peer recommendations in encouraging VR adoption. Thus, the following hypothesis is proposed:

H4. *VR headset social influence has a positive effect on Generation Z's intention to use VR headsets for tourism experiences.*

VR headset use intention (VRI) reflects individuals' willingness to use VR headsets for tourism experiences and represents the motivational basis for subsequent technology engagement (Venkatesh et al., 2003; Huang, 2023). In VR tourism, stronger use intentions may increase engagement with immersive destination environments, where ecological settings and environmental consequences can become more experientially salient. Ecological presence has been shown to enhance tourists' environmentally responsible behavior (Su et al., 2024), while VR-based tourism experiences can stimulate tourists' pro-sustainable behaviors through cognitive and affective responses to immersive content (Zhu et al., 2025). Accordingly, greater intention to engage with VR tourism is expected to encourage pro-environmental behavioural responses among Generation Z. Therefore, the following hypothesis is proposed:

H5. *VR headset use intention has a positive effect on Generation Z's VR- induced pro-environmental behaviour in tourism.*

VR-induced pro-environmental behaviour (VRPB) reflects the extent to which immersive tourism experiences enhance environmental awareness, motivate destination protection, and encourage more responsible tourism behaviour. VR can make environmental conditions, and conservation concerns more salient by strengthening users' connection with virtual ecological environments, thereby fostering environmentally responsible responses (Su et al., 2024). Such sustainability-oriented responses may also shape subsequent tourism decisions, as Generation Z's pro-environmental orientations are associated with behavioural intentions towards environmentally aligned holiday destinations (Nowacki et al., 2023). Accordingly, when VR experiences activate stronger pro-environmental responses, users may become more willing to physically visit the destinations encountered virtually, where these sustainability-oriented motivations can be translated into responsible tourism experiences. Therefore, the following hypothesis is proposed:

H6. *VR-induced pro-environmental behaviour has a positive effect on Generation Z's intention to visit destinations explored previously through VR headsets.*

3. Methodology

Data were collected through an online questionnaire designed in Google Forms and distributed through technology and virtual reality focused social media groups between March and April 2026. The survey targeted Generation Z respondents with previous experience using VR headsets to explore tourism destinations. A total of 164 responses were collected, of which 147 were retained as valid for the final analysis.

The questionnaire consisted of three sections. The first section included two filter questions designed to ensure respondents' eligibility. Participants were first asked whether they were born within the period corresponding to Generation Z (1997-2012) and subsequently whether they had previously used VR headsets

to explore tourism destinations (Slepian et al., 2024). The second section comprised 19 items measuring the seven constructs included in the proposed research model: VR facilitating conditions (VRFC), VR performance expectancy (VRPE), VR effort expectancy (VREE), VR social influence (VRSI), VR use intention (VRI), VR-induced pro-environmental behaviour (VRPB), and destination visit intention (DVI) (Table 1). All items were measured using a five-point Likert scale. The third section collected respondents' demographic characteristics (Table 2).

Partial least squares structural equation modelling (PLS-SEM method) was employed to assess the proposed research model and test the hypothesised relationships (Figure 1). PLS-SEM method is considered suitable for estimating models involving multiple latent constructs and for simultaneously assessing measurement and structural relationships (Hair et al., 2022). Data analysis was performed using SmartPLS software version 4.1.1.5.

4. Results

4.1. Measurement model assessment

The measurement model was assessed in terms of internal consistency reliability, convergent validity, and discriminant validity. As presented in Table 3, composite reliability (rho_c) values ranged from 0.831 to 0.878, exceeding the recommended threshold of 0.70 (Hair et al., 2022). Cronbach's alpha and rho_a values were generally satisfactory, although VRI, VRPE, and VRSI showed values slightly below 0.70. However, given their composite reliability values above 0.80 and AVE values exceeding 0.50, the constructs demonstrated acceptable internal consistency and convergent validity (Hair et al., 2022). AVE values ranged from 0.621 to 0.763, indicating adequate convergent validity across all constructs (Hair et al., 2022).

Table 1. Measurement model constructs and items

Construct	Item description	Abbreviations
Virtual reality headset facilitating conditions (VRFC)	**I have access to VR headsets whenever I want to use them.**	$VRFC_1$
	I have sufficient space to use VR headsets.	$VRFC_2$
	I can get help if I experience technical problems with VR headsets.	$VRFC_3$
Virtual reality headset performance expectancy (VRPE)	**Using VR headsets helps me better understand the distinctive characteristics of a tourist destination.**	$VRPE_1$
	Using VR headsets improves my ability to evaluate a tourist destination.	$VRPE_2$
Virtual reality headset effort expectancy (VREE)	**I find VR headsets easy to use.**	$VREE_1$
	The controls and interface of VR headsets are intuitive.	$VREE_2$
	I feel comfortable using VR headsets.	$VREE_3$
Virtual reality headset social influence (VRSI)	**People who are important to me consider using VR headsets interesting.**	$VRSI_1$
	My friends use VR headsets.	$VRSI_2$
	The opinions of people close to me influence my decision to use VR headsets.	$VRSI_3$
Virtual reality headset use intention (VRI)	I **am likely to use VR headsets for other tourism experiences in the future.**	VRI_1
	I intend to continue using VR headsets to discover new tourist destinations whenever I have the opportunity.	VRI_2
Virtual reality - induced pro-environmental behaviour (VRPB)	V**R headset experiences make me more aware of the environmental impact of tourism.**	$VRPB_1$
	After exploring a destination through VR headsets, I feel more motivated to protect it.	$VRPB_2$
	VR headset experiences positively influence my responsible behaviour while on holiday.	$VRPB_3$
Destination visit intention (DVI)	**I intend to visit in person the destinations I have explored through VR headsets.**	DVI_1
	I am likely to choose destinations explored through VR headsets for a future holiday.	DVI_2
	The tourism experience provided by VR headsets increases my desire to physically visit the destination.	DVI_3

Source: authors

Figure 2 presents the estimated PLS-SEM model, including indicator loadings, path coefficients, and the coefficients of determination (R^2) for the endogenous constructs. All indicator loadings ranged from 0.758 to 0.896, exceeding the recommended threshold of 0.7 and supporting indicator reliability (Hair et al., 2022).

Table 2. Sociodemographic profile of respondents

Segmentation Criteria	Categories	Number of respondents	Percentage (%)
Age	14-18 years	38	25.9
	19-24 years	73	49.7
	25-29 years	36	24.4
Gender	Males	63	42.8
	Females	77	52.4
	I would rather not say	7	4.8
Domicile	Urban	79	53.7
	Rural	68	46.3
Occupation	Employed (technical/administrative/sales/operational/trade)	60	40.8
	Seeking employment	12	8.2
	Student	47	32.0
	Pupil	28	19.0
Net income per month	No personal income	34	23.1
	Below 500 euros	65	44.2
	500-1000 euros	39	26.5
	Above 1000 euros	9	6.1
Total		**147**	**100%**

Source: the authors

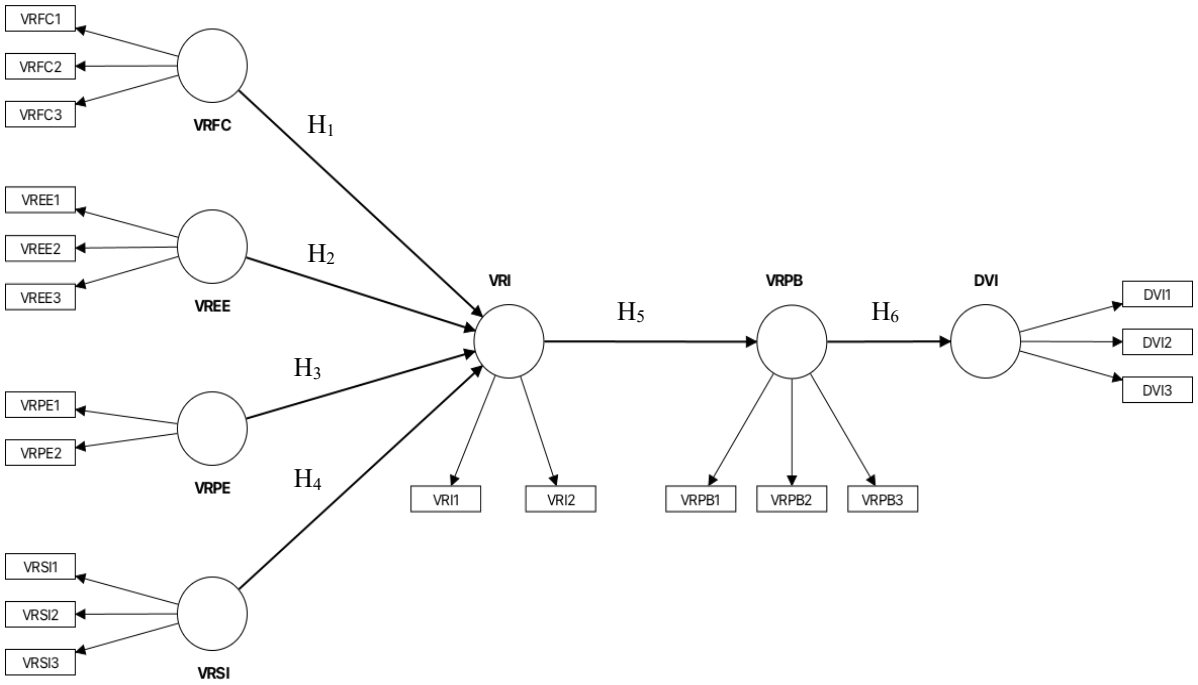

Figure 1. Conceptual research model

Source: the authors

Notes: VRFC = Virtual reality headset facilitating conditions; VREE =Virtual reality headset effort expectancy; VRPE =Virtual reality headset performance expectancy; VRSI = Virtual reality headset social influence; VRI = Virtual reality headset use intention; VRPB = Virtual reality-induced pro-environmental behaviour; DVI = destination visit intention.

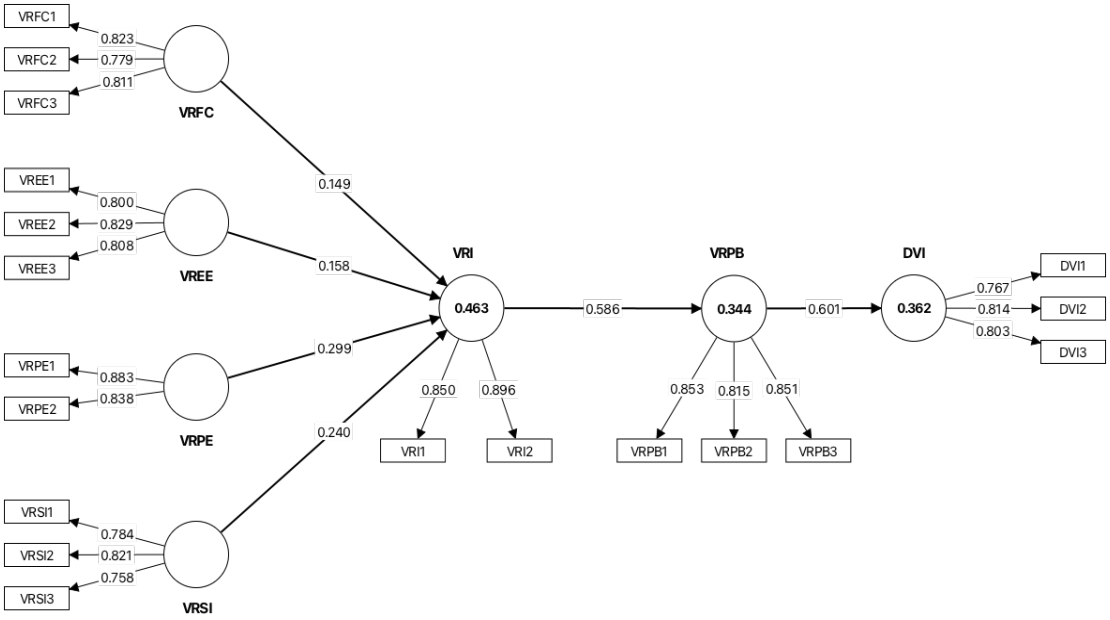

Figure 2. The effect coefficients and external loadings of latent reflective variables

Source: authors based on graphs generated by SmartPLS software

Notes: VRFC = Virtual reality headset facilitating conditions; VREE =Virtual reality headset effort expectancy; VRPE =Virtual reality headset performance expectancy; VRSI = Virtual reality headset social influence; VRI = Virtual reality headset use intention; VRPB = Virtual reality-induced pro-environmental behaviour; DVI = destination visit intention.

Table 3. Internal consistency and convergent validity of the research model

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
DVI	0.712	0.722	0.838	0.632
VREE	0.744	0.750	0.854	0.660
VRFC	0.729	0.733	0.847	0.648
VRI	0.691	0.704	0.865	0.763
VRPB	0.792	0.799	0.878	0.706
VRPE	0.652	0.662	0.851	0.741
VRSI	0.695	0.702	0.831	0.621

Source: authors based on Smart-PLS software

Notes: VRFC = Virtual reality headset facilitating conditions; VREE =Virtual reality headset effort expectancy; VRPE =Virtual reality headset performance expectancy; VRSI = Virtual reality headset social influence; VRI = Virtual reality headset use intention; VRPB = Virtual reality-induced pro-environmental behaviour; DVI = destination visit intention.

Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT). All HTMT values ranged from 0.604 to 0.833 and remained below the conservative threshold of 0.85 recommended for assessing discriminant validity (Hair et al., 2022). Therefore, discriminant validity was established for all constructs (Table 4).

Table 4. Discriminant validity (HTMT ratio)

Construct	DVI	VREE	VRFC	VRI	VRPB	VRPE	VRSI
DVI							
VREE	0.799						
VRFC	0.769	0.758					
VRI	0.606	0.716	0.684				
VRPB	0.786	0.696	0.761	0.782			
VRPE	0.704	0.667	0.604	0.833	0.826		
VRSI	0.828	0.767	0.745	0.818	0.792	0.821	

Source: authors based on Smart-PLS software

Notes: VRFC = Virtual reality headset facilitating conditions; VREE =Virtual reality headset effort expectancy; VRPE =Virtual reality headset performance expectancy; VRSI = Virtual reality headset social influence; VRI = Virtual reality headset use intention; VRPB = Virtual reality-induced pro-environmental behaviour; DVI = destination visit intention.

4.2. Structural model assessment and hypothesis testing

Prior to hypothesis testing, collinearity was assessed using the variance inflation factor (VIF). The VIF values ranged from 1.000 to 1.851, remaining below the recommended threshold of 3 and indicating no critical collinearity issues in the structural model (Hair et al., 2022) (Table 5).

Table 5. Collinearity statistics within the inner model

Structural path	VIF
VREE -> VRI	1.763
VRFC -> VRI	1.633
VRI -> VRPB	1.000
VRPB -> DVI	1.000
VRPE -> VRI	1.536
VRSI -> VRI	1.851

Source: authors based on Smart-PLS software

Notes: VRFC = Virtual reality headset facilitating conditions; VREE =Virtual reality headset effort expectancy; VRPE =Virtual reality headset performance expectancy; VRSI = Virtual reality headset social influence; VRI = Virtual reality headset use intention; VRPB = Virtual reality-induced pro-environmental behaviour; DVI = destination visit intention.

The model explained 46.3% of the variance in VR use intention (R^2 = 0.463), 34.4% of the variance in VR-induced pro-environmental behaviour (R^2 = 0.344), and 36.2% of the variance in destination visit intention (R^2 = 0.362), indicating meaningful in-sample explanatory power across the endogenous constructs (Hair et al., 2022) (Figure 2).

The results of hypothesis testing are presented in Table 6. VR facilitating conditions had a positive but non-significant effect on VR use intention (β = 0.149, *t* = 1.725, *p* = 0.085); therefore, H1 was not supported. Similarly, VR effort expectancy had a positive but non-significant effect on VR use intention (β = 0.158, *t* = 1.719, *p* = 0.086), and H2 was not supported.

In contrast, VR performance expectancy significantly and positively influenced VR use intention (β = 0.299, *t* = 3.194, *p* = 0.001), supporting H3. VR social influence also exerted a significant positive effect on VR use intention (β = 0.240, *t* = 2.399, *p* = 0.016), supporting H4.

Table 6. Values for the asymptotic significance (p) and t-test for the structural model hypotheses

Hypothesis/ Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decision
H1: VRFC -> VRI	0.149	0.159	0.086	1.725	0.085	Not supported
H2: VREE -> VRI	0.158	0.161	0.092	1.719	0.086	Not supported
H3: VRPE -> VRI	0.299	0.296	0.094	3.194	0.001	Supported
H4: VRSI -> VRI	0.240	0.234	0.100	2.399	0.016	Supported
H5: VRI -> VRPB	0.586	0.587	0.073	8.068	0.000	Supported
H6: VRPB -> DVI	0.601	0.609	0.062	9.768	0.000	Supported
Indirect effect: VRI → VRPB → DVI	0.353	0.357	0.054	6.470	0.000	**Significant**

Source: authors based on Smart-PLS software

Notes: VRFC = Virtual reality headset facilitating conditions; VREE =Virtual reality headset effort expectancy; VRPE =Virtual reality headset performance expectancy; VRSI = Virtual reality headset social influence; VRI = Virtual reality headset use intention; VRPB = Virtual reality-induced pro-environmental behaviour; DVI = destination visit intention.

The strongest relationships emerged in the extended behavioural sequence of the model. VR use intention significantly and positively influenced VR-induced pro-environmental behaviour ($\beta = 0.586$, $t = 8.068$, $p < 0.001$), supporting H5. In turn, VR-induced pro-environmental behaviour had a significant positive effect on destination visit intention ($\beta = 0.601$, $t = 9.768$, $p < 0.001$), supporting H6. Thus, four of the six proposed hypotheses were validated.

The mediating role of VR-induced pro-environmental behaviour was further assessed through the specific indirect effect. The indirect effect of VR headset use intention on destination visit intention through VR-induced pro-environmental behaviour was positive and significant ($\beta = 0.353$, $t = 6.470$, $p < 0.001$), supporting the mediating role of VRPB in the relationship between VRI and DVI.

5. Discussion

The findings show that Generation Z's intention to use virtual reality headsets for tourism is primarily driven by performance expectancy and social influence, while facilitating conditions and effort expectancy have no significant effects. The non-significant influence of VR headset facilitating conditions (H1) suggests that access to VR headsets, adequate space, and technical support may represent enabling conditions rather than direct adoption motives. This result is in line with Merz et al. (2025), who did not identify facilitating conditions as a significant predictor of behavioural intention in an immersive VR context.

VR headset effort expectancy also had no significant effect on use intention (H2), indicating that ease of use, intuitive controls, and comfort may be expected characteristics rather than adoption drivers for Generation Z users with previous VR experience. This finding directly aligns with Lisana et al. (2025), who found no significant influence of perceived ease of use on Gen Z's acceptance of VR tourism.

In contrast, VR headset performance expectancy positively influenced use intention (H3), showing that Generation Z is more likely to adopt VR headsets when they provide meaningful benefits for understanding and evaluating tourist destinations. This result is consistent with Merz et al. (2025), who identified performance expectancy as a significant driver of behavioural intention towards immersive VR. Social influence also positively affected VR headset use intention (H4), supporting the role of relevant social groups in VR adoption. This finding closely corresponds with Lisana et al. (2025), who identified social influence as the most prominent predictor of VR tourism acceptance among Generation Z.

Beyond technology adoption, VR headset use intention strongly influenced VR-induced pro-environmental behaviour (H5). Thus, willingness to engage with VR tourism is associated with greater environmental awareness, destination protection motivation, and responsible tourism responses. This finding complements previous evidence that immersive VR tourism can foster environmentally responsible behaviour through ecological presence (Su et al., 2024) and stimulate pro-sustainable responses through cognitive and affective mechanisms (Zhu et al., 2025). These studies support the broader link between immersive VR experiences and sustainability-oriented responses, although they do not test the same structural relationship examined in the present study.

Finally, VR-induced pro-environmental behaviour positively influenced destination visit intention (H6). This suggests that sustainability-oriented responses activated by VR experiences may strengthen Generation Z's willingness to physically visit virtually explored destinations. The result is broadly consistent with Nowacki et al. (2023), who linked Generation Z's environmental and green tourism orientations with behavioural intentions towards sustainable destinations.

6. Conclusions

6.1. Theoretical and practical implications

This research contributes to technology adoption and tourism research by extending UTAUT framework to examine VR headset adoption and its relationship with VR-induced pro-environmental behaviour and destination visit intention among Generation Z. The findings suggest that performance expectancy and social influence are more relevant to Generation Z's intention to use VR headsets for tourism than facilitating conditions and effort expectancy. These results provide further evidence that the relative importance of UTAUT predictors may vary according to the technology and user context.

The study also extends the conventional technology acceptance perspective by examining sustainability-oriented and tourism-related responses associated with VR headset use intention. The positive relationships between VR headset use intention, VR-induced pro-environmental behaviour, and destination visit intention suggest that willingness to use VR headsets for tourism experiences may be associated with greater environmental awareness, protection motivation, and responsible tourism responses, which in turn relate to stronger intentions to physically visit virtually explored destinations. These findings complement emerging research on the potential of immersive VR tourism experiences to foster environmentally responsible and pro-sustainable responses.

From a practical perspective, destination management organisations and tourism marketers could develop VR headset-based tourism experiences that emphasise realistic destination representation and provide useful information for destination understanding and evaluation. Given the role of social influence, peer recommendations, user-generated content, and socially embedded communication may also support engagement with VR headset experiences among Generation Z. Environmental interpretation and destination protection messages could be integrated into immersive content to encourage sustainability-oriented responses. However, VR headset experiences should be considered complementary tools for destination marketing and sustainability communication rather than assumed substitutes for physical tourism.

6.2. Limitations and future research

This study has several limitations. First, the relatively small sample of 147 valid Gen Z's respondents and recruitment through technology-focused social media groups may limit the generalisability of the findings and favour individuals with greater interest in digital technologies. Future research should target larger and more diverse samples and examine different cultural and geographical contexts.

Second, the cross-sectional design captures perceptions and intentions at a single point in time and does not establish whether VR headset use intention translates into subsequent use, observable pro-environmental behaviour, or actual destination visits. Longitudinal and experimental studies could examine these behavioural transitions more directly.

Third, VR-induced pro-environmental behaviour was measured through environmental awareness, protection motivation, and perceived influence on responsible tourism behaviour. Future studies could distinguish these cognitive, motivational, and behavioural responses and assess observable pro-environmental actions following VR headset exposure. Research could also compare different headset types, levels of immersion, and forms of tourism content, as VR interventions have been examined as potential triggers of pro-environmental responses but their effects may depend on the specific immersive experience.

Declaration of generative AI and AI-assisted technologies in the writing process

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References

Bilynets, I., Trkman, P., & Knežević Cvelbar, L. (2024). Virtual tourism experiences: adoption factors, participation and readiness to pay. *Current Issues in Tourism*, *27*(22), 3658-3675. https://doi.org/10.1080/13683500.2023.2268809

Blut, M., Chong, A. Y. L., Tsiga, Z., & Venkatesh, V. (2022). Meta-analysis of the unified theory of acceptance and use of technology (UTAUT): challenging its validity and charting a research agenda in the red ocean. Association for Information Systems. https://doi.org/10.17705/1jais.00719

Bogicevic, V., Seo, S., Kandampully, J. A., Liu, S. Q., & Rudd, N. A. (2019). Virtual reality presence as a preamble of tourism experience: The role of mental imagery. *Tourism management*, *74*, 55-64. https://doi.org/10.1016/j.tourman.2019.02.009

de Lurdes Calisto, M., & Sarkar, S. (2024). A systematic review of virtual reality in tourism and hospitality: The known and the paths to follow. *International Journal of Hospitality Management*, *116*, 103623. https://doi.org/10.1016/j.ijhm.2023.103623

Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism management*, *31*(5), 637-651. https://doi.org/10.1016/j.tourman.2009.07.003

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A primer on partial least squares structural equation modeling (PLS-SEM) (3rd ed.). SAGE Publications.

Huang, Y. C., Backman, S. J., Backman, K. F., & Moore, D. (2013). Exploring user acceptance of 3D virtual worlds in travel and tourism marketing. *Tourism management*, *36*, 490-501. https://doi.org/10.1016/j.tourman.2012.09.009

Huang, Y. C., Backman, K. F., Backman, S. J., & Chang, L. L. (2016). Exploring the implications of virtual reality technology in tourism marketing: An integrated research framework. *International Journal of Tourism Research*, *18*(2), 116-128. https://doi.org/10.1002/jtr.2038

Huang, Y. C. (2023). Integrated concepts of the UTAUT and TPB in virtual reality behavioral intention. *Journal of Retailing and Consumer Services*, *70*, 103127. https://doi.org/10.1016/j.jretconser.2022.103127

Kasilingam, D., Jain, V., Bilgihan, A., & Mukherjee, P. (2027). From metaverse to the physical world: Developing a theoretical model of users' intention to visit hospitality properties. *International Journal of Hospitality Management*, *140*, 104820. https://doi.org/10.1016/j.ijhm.2026.104820

Lisana, L., Dinata, H., & Khosasih, M. M. (2025). Factors influencing Gen Z's intention to use VR in tourism based on TPE perspectives. *Asian Journal of Business Research*, *15*(3), 65-85. https://doi.org/10.14707/ajbr.250201

Loureiro, S. M. C., Guerreiro, J., & Ali, F. (2020). 20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach. *Tourism management*, *77*, 104028. https://doi.org/10.1016/j.tourman.2019.104028

Merz, A., Moser, I., & Bergamin, P. B. (2025). Performance expectancy and social influence drive the acceptance of immersive virtual reality for professional collaboration. *Virtual Reality*, *29*(3), 123. https://doi.org/10.1007/s10055-025-01182-5

Mosbeh, R. (2025). Factors influencing success of virtual reality in Tunisia's cultural heritage tourism sites: a UTAUT2 approach extension. *Virtual Reality*, *29*(1), 26. https://doi.org/10.1007/s10055-025-01101-8

Nam, K., Baker, J., & Dutt, C. S. (2024). Does familiarity with the attraction matter? Antecedents of satisfaction with virtual reality for heritage tourism. *Information Technology & Tourism*, *26*(1), 25-57. https://doi.org/10.1007/s40558-023-00273-w

Nguyen, T. V., Bui, T. Q. T., & Bui, L. P. (2024). Integrating tpb, vab and generation theory in studying the green tourism behavior of generation Z: A study in Vietnam. *Geo Journal of Tourism and Geosites*, *57*, 1930-1940. https://doi.org/10.30892/gtg.574spl07-1360

Nowacki, M., Kowalczyk-Anioł, J., & Chawla, Y. (2023). Gen Z's attitude towards green image destinations, green tourism and behavioural intention regarding green holiday destination choice: A study in Poland and India. *Sustainability*, *15*(10), 7860. https://doi.org/10.3390/su15107860

Oncioiu, I., & Priescu, I. (2022). The use of virtual reality in tourism destinations as a tool to develop tourist behavior perspective. *Sustainability*, *14*(7), 4191. https://doi.org/10.3390/su14074191

Peštek, A., & Savan, M. (2020). Traveling before traveling: Virtual reality marketing in support of greater tourism sustainability. *Acta turistica*, *32*(1), 39-74. https://doi.org/10.22598/at/2020.32.1.39

Popșa, R. E. (2024). Exploring the generation Z travel trends and behavior. *Studies in Business and Economics*, *19*(1), 189-189. https://doi.org/10.2478/sbe-2024-0010

Slepian, R. C., Vincent, A. C., Patterson, H., & Furman, H. (2024). Social media, wearables, telemedicine and digital health —A Gen Y and Z perspective. *Comprehensive Precision Medicine*, 1, 524-544 https://doi.org/10.1016/B978-0-12-824010-6.00072-1

Su, Z., Lei, B., Lu, D., Lai, S., & Zhang, X. (2024). Impact of ecological presence in virtual reality tourism on enhancing tourists' environmentally responsible behavior. *Scientific Reports*, *14*(1), 5939. https://doi.org/10.1038/s41598-024-56615-z

Tussyadiah, I. P., Wang, D., Jung, T. H., & Tom Dieck, M. C. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism management*, *66*, 140-154. https://doi.org/10.1016/j.tourman.2017.12.003

24. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view1. *MIS quarterly*, *27*(3), 425-478. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the Unified Theory of Acceptance and Use of Technology1. *MIS quarterly*, *36*(1), 157-178. https://doi.org/10.2307/41410412

Verma, S., Warrier, L., Bolia, B., & Mehta, S. (2022). Past, present, and future of virtual tourism-a literature review. *International Journal of Information Management Data Insights*, *2*(2), 100085. https://doi.org/10.1016/j.jjimei.2022.100085

Wu, S., & Wang, S. (2025). Exploring the impact of AI-enhanced virtual tourism on Tourists' pro-environmental behavior: A stimulus-organism-response model perspective. *Acta Psychologica*, *253*, 104773. https://doi.org/10.1016/j.actpsy.2025.104773

Zhu, Z., Hall, C. M., Li, Y., & Zhang, X. (2025). Exploring the impact of virtual reality on tourists' pro-sustainable behaviors in heritage tourism. *Sustainability*, *17*(14), 6278. https://doi.org/10.3390/su17146278