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From Smart Technologies to Visit Intention: The Mediating Role of Sustainability Among Generation Z in Digitally Enhanced Cultural Destinations

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Abstract

The digital transformation of cultural tourism has increased interest in understanding how technological innovation and sustainability influence destination choice among younger travellers. Grounded in the Theory of Planned Behavior, this study examines the relationship between Smart Technologies, Sustainability, and Generation Z's intention to visit digitally enhanced cultural destinations. Data were collected from 354 Generation Z respondents and analysed using SmartPLS4, complemented by mediation analysis, Importance–Performance Map Analysis, PLSpredict, and the Cross-Validated Predictive Ability Test. The findings reveal that Smart Technologies exert a strong positive effect on Visit Intention ($\beta = 0.575$, $p < 0.001$) and Sustainability ($\beta = 0.437$, $p < 0.001$), while Sustainability also positively influences Visit Intention ($\beta = 0.194$, $p < 0.001$). Sustainability partially mediates the relationship between Smart Technologies and Visit Intention ($\beta = 0.085$, $p < 0.001$). The model explains 46.6% of the variance in Visit Intention, while IPMA identifies Smart Technologies as the most influential managerial priority. The study contributes to smart tourism literature by providing an integrated TPB-based framework linking technology, sustainability, and destination intention. The findings suggest that technological innovation is the primary driver of Visit Intention, while Sustainability plays a complementary role among Generation Z travellers.

Keywords: Generation Z; smart tourism; smart technologies; sustainability; digitally enhanced cultural destinations; visit intention; Theory of Planned Behavior

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1. Introduction

The rapid expansion of the global digital economy has fundamentally reshaped the tourism sector. This transformation has given rise to smart tourism destinations (STDs), which rely on interconnected and intelligent technological ecosystems. Cultural tourism has traditionally been associated with physical assets, such as museums, historical landmarks, and archaeological parks. However, it is undergoing a substantial transformation within the current digital environment. Cultural destinations are increasingly integrating smart tourism technologies (STTs) and becoming digitally enhanced (Richards, 2018; Wu et al., 2024; Bekele & Raj, 2025; Gutierriz et al., 2025). These innovations include augmented and virtual reality (AR/VR), artificial intelligence (AI)-driven tour guides, smart ticketing platforms, and location-based mobile applications. Such tools represent more than

infrastructural additions. They transform passive sightseeing into personalised, interactive, and immersive experiences (Neuhofer et al., 2014; Chung et al., 2015; Jung, 2017). As digital capabilities expand, destination management organizations (DMOs) must align their strategies with the preferences of emerging consumer groups. Younger travellers are particularly important in this context. Born between 1997 and 2012, Generation Z represents the first generation of digital natives. Its members have grown up with internet connectivity, smartphones, and immediate access to information (Priporas et al., 2017; Robinson & Schänzel, 2019; Parker & Igielnik, 2020). Their travel decisions and experiential expectations therefore differ from those of previous generations. High technological integration is not necessarily perceived as a luxury or novelty by this cohort. Instead, it may represent a basic expectation for destination engagement (Haddouche & Salomone, 2018; Francis & Hoefel, 2018). Understanding how digital features shape their travel motivations is therefore important for the future development of cultural tourism. However, the rapid growth of digital tourism also creates challenges for heritage preservation. Many historical cities and landmarks face overtourism, sociocultural commodification, and environmental degradation (Koens et al., 2018; Milano et al., 2019). Technological development should therefore not operate independently of responsible management objectives. It should form part of a broader approach to protecting environmental, cultural, and community resources.

In technology-enabled cultural settings, smart infrastructure can serve two purposes. It can enhance visitor engagement while supporting sociocultural authenticity, economic viability, and environmental conservation (Buhalis & Amaranggana, 2015; Wu et al., 2024). For example, data-driven applications can manage visitor flows and reduce pressure on fragile heritage assets. Digital platforms can also provide information on local customs and environmental protection (Bec et al., 2019). Integrating innovation with responsible management is therefore important for the long-term viability of cultural tourism. The connection between digitalisation and sustainable destination practices is especially relevant to this cohort. Beyond being digital natives, these young travellers are often associated with environmental awareness, ethical consumption, and social responsibility (Djafarova & Foots, 2022; Robinson & Schänzel, 2019). They may seek experiences that respect local communities and protect tangible and intangible cultural heritage (Richards, 2018; Bortolotto & Skounti, 2023). Nevertheless, an important gap remains in the hospitality and tourism literature. Existing studies have applied socio-cognitive frameworks, including the Theory of Planned Behavior (TPB), to examine technology adoption and responsible travel intentions. These topics have largely developed as separate research streams (Esfandiar & Hadinejad, 2026; Nadee et al., 2024; Fu & Zhao, 2024). Limited attention has been given to integrated hierarchical models. In particular, little is known about whether technology-related evaluations shape perceptions of responsible destination practices and, in turn, Visit Intention among young travellers. This gap is especially evident in digital cultural tourism contexts. To address this gap, the study develops an integrated framework grounded in the Theory of Planned Behavior (Ajzen, 1991). It examines the relationships among Smart Technologies, Sustainability, and Visit Intention within digitally enhanced cultural destinations. Specifically, the study investigates whether Smart Technologies are directly associated with Visit Intention. It also examines whether they influence Sustainability evaluations and whether Sustainability mediates this relationship. By focusing on this generational cohort, the study contributes to the literature on digital tourism and sustainable consumer behaviour. It also provides practical insights for DMOs seeking to combine technological innovation with responsible cultural destination development.

2. Theoretical Framework

2.1. The Theory of Planned Behavior and Generation Z

The Theory of Planned Behavior (TPB), conceptualized by Ajzen (1991), has long served as the foundational paradigm for predicting human decision-making and consumer behavior in hospitality and tourism research. Despite its widespread empirical validation, the traditional TPB framework has faced significant critical scrutiny from contemporary behavioral theorists. A recurring academic critique of the classical TPB concerns its linear specification, in which attitude, subjective norms, and perceived behavioral control are modeled as parallel and largely independent predictors of behavioral intention. Scholars argue that this structure may oversimplify the complexity of human decision-making by insufficiently accounting for the dynamic and overlapping psychological interactions that shape consumer behavior, particularly in rapidly evolving digital environments (Sniehotta et al., 2014; Esfandiar & Hadinejad, 2026; Wut et al., 2023). To address these limitations, recent tourism research has increasingly adopted multidimensional conceptualisations and hierarchical component models to represent complex behavioural phenomena more comprehensively (Sarstedt et al., 2019; Hair et al., 2021; Wu et al., 2024). In the present study, Smart Technologies (TECH) and Sustainability (SUS) are conceptualised as reflective–formative higher-order constructs (Coltman et al., 2008; Jarvis et al., 2003). Rather than referring to the objective presence of technological or sustainable destination features, these constructs represent tourists' broader behavioural orientations towards the corresponding destination-attribute domains. At the lower-order level, Attitude, Subjective Norms and Perceived Behavioural Control are specified reflectively because their indicators represent manifestations of the corresponding attitudinal, normative or control-related dimension. This specification maintains the conceptual distinction among the three core TPB components established by Ajzen (1991), while organising them around the two evaluative domains. At the higher-order level, the three dimensions are specified formatively because they are conceptually distinct, non-interchangeable and may vary independently, while jointly defining the broader technology- or sustainability-related orientation. A favourable attitude, for example, does not necessarily imply strong social endorsement or high perceived control, and omitting any dimension would alter the conceptual coverage of the corresponding higher-order construct. This specification is consistent with hierarchical component modelling principles, according to which distinct lower-order dimensions can jointly form a broader multidimensional construct (Becker et al., 2012; Sarstedt et al., 2019; Hair et al., 2021). Compared with conventional TPB models, which typically estimate Attitude, Subjective Norms and Perceived Behavioural Control as separate parallel predictors of intention (Ajzen, 1991), the hierarchical structure preserves the contribution of each component while enabling comparison of the two higher-order constructs and examination of their direct and mediated relationships with intention. It also aligns with recent tourism research advocating multidimensional representations of complex behaviour in digitally mediated consumption environments (Wu et al., 2024).

Existing TPB-based tourism research has developed across related but insufficiently connected streams. Studies in smart tourism demonstrate that technology-related Attitudes, Subjective Norms and Perceived Behavioural Control can shape technology adoption and travel intention (Novianti et al., 2022; Hasan et al., 2024). However, their primary emphasis is on the direct contribution of technological features to destination choice, providing limited insight into whether these features also influence sustainability-related evaluations. In parallel, sustainability-focused studies show that environmental beliefs, normative influences and perceived control can support responsible travel intentions (Siddiqui et al., 2023; Fauzi et al., 2024; Fu & Zhao, 2024). In these studies, however, sustainability is generally examined as a distinct antecedent of behaviour rather than as

part of a technology-enabled destination-choice process. Consequently, although both research streams demonstrate the adaptability of TPB, they provide a fragmented account of how technology-related and sustainability-related evaluations may operate together.

The need for an integrated perspective is particularly relevant to Generation Z. This cohort's travel expectations and information-processing behaviours are strongly shaped by digital connectivity and platform-mediated interaction (Priporas et al., 2017; Haddouche & Salomone, 2018; Robinson & Schänzel, 2019; Vašaničová et al., 2025; Ivasciuc et al., 2025; Fu & Zhao, 2024). Its normative influences increasingly include online communities, social media and digital information ecosystems (Vrontis et al., 2021), while Perceived Behavioural Control is closely associated with technological accessibility and digital self-efficacy (Buhalis & Karatay, 2022). Nevertheless, these characteristics are commonly discussed separately from sustainability-related destination evaluations, limiting understanding of how technology-related and sustainability-related perceptions jointly shape Visit Intention in technology-enabled cultural settings. The unresolved issue is therefore not whether the two domains independently influence tourism behaviour, but how their effects are connected. Specifically, the research reviewed above does not establish whether technology-related evaluations influence Visit Intention only directly or also indirectly through Sustainability. The present study addresses this issue by modelling both domains as reflective–formative higher-order constructs and examining their direct and mediated relationships with the cohort's Visit Intention. In doing so, the framework provides a context-specific application of TPB by integrating two previously separate destination-attribute domains within the setting of digitally enhanced cultural destinations.

2.2. Smart Technologies and Visit Intention

STTs, including augmented reality applications, artificial intelligence-enabled guides, and location-based digital tools, are increasingly recognized for enhancing accessibility, enriching cultural interpretation, and transforming traditional sightseeing into more interactive and immersive tourism experiences (Chung et al., 2015; Jung, 2017; Xu et al., 2025; Pricope Vancia et al., 2023). However, contemporary tourism scholarship presents a more nuanced debate regarding their actual behavioral consequences. While a substantial body of research suggests that digital enhancements can strengthen visitor engagement and increase destination visit intention, critical scholars caution that hyper-connected tourism experiences may also produce unintended negative effects (Hassan & Saleh, 2024). Specifically, excessive reliance on smartphones, social media, and screen-based interfaces may contribute to digitally mediated distraction, reducing tourists' direct engagement with the physical environment and cultural setting (Irimiás, 2023). Furthermore, intrusive or poorly designed technological interventions may generate cognitive overload and technology fatigue, ultimately diminishing the overall quality and authenticity of the tourism experience (Hassan & Saleh, 2024; Limberger et al., 2025). Despite these competing perspectives, the behavioral implications of digital tourism technologies may differ substantially across generational cohorts. For Generation Z, digital technologies are less likely to be perceived as optional enhancements and more likely to represent an expected component of contemporary travel experiences, reflecting their high degree of digital embeddedness and habitual engagement with connected environments (Marozzo et al., 2024; Ivasciuc et al., 2025). While concerns regarding digital distraction remain valid in broader tourism contexts (Hassan & Saleh, 2024), younger travelers may interpret digitally mediated experiences differently, particularly when technology enhances accessibility, personalization, and immersive engagement within cultural tourism settings (Buhalis & Karatay, 2022). In this context, smart technologies may function not as barriers to experience, but as facilitators of

perceived control and positive experiential evaluation, thereby strengthening visit intention among digitally native cohorts. Accordingly, the following hypothesis is proposed:

Hypothesis 1 (H1). *Smart technologies positively influence Generation Z's intention to visit digitally enhanced cultural destinations.*

2.3. Smart Technologies and Sustainability

The relationship between technological integration and destination sustainability represents another area characterized by academic tension. Optimistic smart tourism and Industry 4.0 perspectives position digital systems as important enablers of sustainable destination governance, suggesting that visitor-flow monitoring, AI-driven analytics, and digital tourism platforms can support the mitigation of overtourism, improve resource allocation, and enhance broader sustainability outcomes (Zubiaga et al., 2019; Zeqiri et al., 2025). Conversely, a growing body of critical scholarship highlights the paradoxical tension between smart tourism development and sustainability objectives. While digital infrastructures are often positioned as enablers of sustainable destination governance, scholars caution that smart tourism ecosystems may generate hidden environmental costs through energy-intensive data processing, cloud computing, and digital infrastructures, raising important questions regarding the true sustainability footprint of technology-led destination transformation (El Archi et al., 2023; Tan et al., 2025). From a socio-cultural perspective, critics warn that intensive digital mediation may contribute to new forms of heritage commodification. Cultural tourism scholarship has long highlighted the risks of commercializing local traditions and symbolic spaces for visitor consumption (Richards, 2018), while sustainability-oriented research emphasizes the importance of protecting community cultural integrity (Duxbury et al., 2020). In parallel, emerging youth tourism literature suggests that social media-driven travel behaviors may reinforce the demand for visually curated and digitally performative tourism experiences (Irimiás, 2023), raising concerns that cultural heritage may increasingly be simplified into consumable digital representations.

This study explicitly acknowledges this paradox but proposes that the relationship between smart technologies and sustainability may be better understood through a socio-cognitive lens such as the Theory of Planned Behavior. While critical scholarship highlights the environmental and socio-cultural tensions associated with digital tourism transformation, emerging research suggests that digital tools may also support more responsible tourism practices through improved information access, transparency, and value co-creation (Ribes & Ivars Baidal, 2018; Bhuiyan et al., 2022; Inmor et al., 2025). For digitally embedded cohorts such as Generation Z, smart technologies may therefore be interpreted not solely as potential threats to authenticity or sustainability, but as facilitators of more informed and responsible tourism engagement. Accordingly, the following hypothesis is proposed:

Hypothesis 2 (H2). *Smart technologies positively influence sustainability in digitally enhanced cultural destinations.*

2.4. Sustainability and Visit Intention

The relationship between sustainability and destination visit intention remains theoretically important but not entirely straightforward. Sustainable tourism research generally suggests that environmentally and culturally responsible destination attributes can enhance destination attractiveness and strengthen tourists' behavioral intentions (Fauzi et al., 2024; Fu & Zhao, 2024; Nowacki et al., 2023). However, sustainability does not always function as the dominant decision criterion when younger tourists simultaneously evaluate competing attributes such as affordability, convenience, experiential appeal, and overall travel value,

suggesting that pro-sustainability attitudes may coexist with more pragmatic consumption priorities (Vilkaite-Vaitone, 2026; Grechi & Minazzi, 2025). This tension is particularly relevant for Generation Z. Although this cohort is frequently characterized by elevated environmental awareness, ethical sensitivity, and stronger support for sustainable tourism principles, their travel decision-making may still be influenced by economic constraints, experiential expectations, and digitally mediated consumption preferences (Minazzi & Grechi, 2025; Nguyen et al., 2025; Seyfi et al., 2025; Schönherr & Pikkemaat, 2024) Consequently, such considerations alone may not automatically translate into stronger destination intention unless it is perceived as personally relevant, socially reinforced, and practically attainable. Within this study, sustainability is therefore conceptualized not as an isolated ethical attribute, but as a multidimensional socio-cognitive construct shaped by attitudes, subjective norms, and perceived behavioral control within the Theory of Planned Behavior framework. By examining this relationship specifically within technology-enabled cultural settings, this study evaluates whether sustainability-related perceptions meaningfully strengthen Generation Z's intention to visit such destinations. Accordingly, the following hypothesis is proposed:

Hypothesis 3 (H3). *Sustainability positively influences Generation Z's intention to visit digitally enhanced cultural destinations.*

2.5. The Mediating Role of Sustainability

The preceding hypotheses position the two domains as interrelated components of a broader decision-making process. Smart tourism research increasingly suggests that digital tools can support sustainable value creation by improving information transparency, enabling more responsible destination management, and enhancing tourists' awareness of sustainability-related practices (Ribes & Ivars Baidal, 2018; Bhuiyan et al., 2022; El Archi et al., 2023; Inmor et al., 2025). At the same time, sustainable destination attributes have been shown to positively influence tourists' behavioral intentions, particularly when sustainability is perceived as meaningful, socially endorsed, and practically attainable (Fauzi et al., 2024; Fu & Zhao, 2024; Nowacki et al., 2023). Sustainability-related evaluations may therefore provide an explanatory pathway between technology and intention. Within the study context, digital capability may signal responsible destination management in addition to supporting convenience and engagement. For this digitally connected cohort, such perceptions may help explain how technology-enabled environments translate into stronger destination intentions. Accordingly, the following hypothesis is proposed:

Hypothesis 4 (H4). *Sustainability mediates the relationship between smart technologies and Generation Z's intention to visit digitally enhanced cultural destinations.*

Based on the theoretical foundations of the Theory of Planned Behavior (Ajzen, 1991) and prior research on smart tourism technologies and sustainable destination development, a hierarchical research framework was developed to investigate the determinants of the members of this generation intention to visit such destinations. The proposed model assumes that Smart Technologies and Sustainability represent higher-order constructs reflected by attitudes, subjective norms, and perceived behavioural control. Furthermore, Sustainability is expected to mediate the relationship between Smart Technologies and Visit Intention. Accordingly, the conceptual framework was specified and estimated using a two-stage hierarchical component modelling (HCM) approach. In the first stage, the lower-order TPB dimensions (attitude, subjective norms and perceived behavioural control) were modelled separately. In the second stage, their latent variable scores served as indicators of

the higher-order constructs Smart Technologies and Sustainability. Figures 1 and 2 illustrate the two stages of the proposed framework.

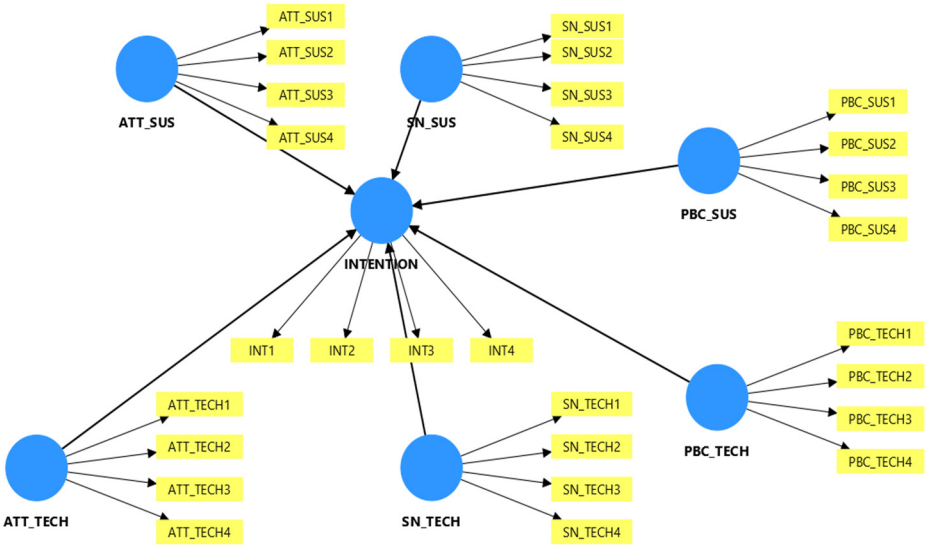


Figure 1. First-stage model used for the estimation of lower-order component scores. Note: ATT = Attitude; SN = Subjective Norms; PBC = Perceived Behavioural Control. Figure 1 illustrates the first-order conceptual framework in which the TPB dimensions (ATT, SN and PBC) are modelled as separate lower-order constructs representing evaluations of Smart Technologies and Sustainability. Visit Intention is specified as the endogenous construct.

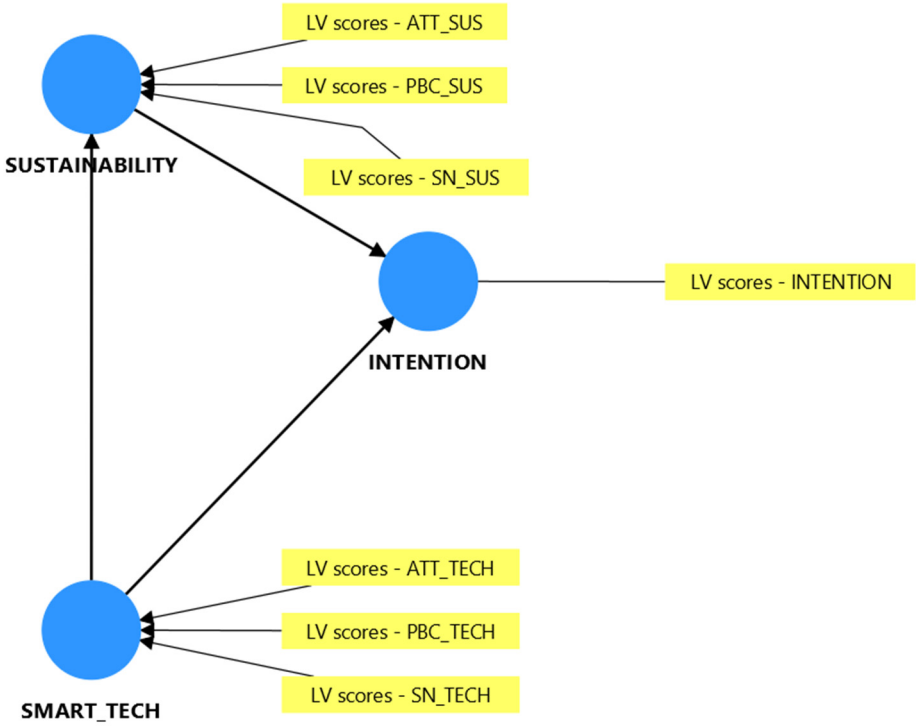


Figure 2. Higher-order research model of Smart Technologies, Sustainability, and Visit Intention. Note: ATT = Attitude; SN = Subjective Norms; PBC = Perceived Behavioural Control. Figure 2 presents the second-order hierarchical component model (HCM) estimated using the two-stage PLS-SEM approach. Latent variable scores obtained from the first-stage lower-order constructs (ATT, SN and PBC) were used as indicators of the higher-order constructs Smart Technologies and Sustainability. The arrows represent the hypothesised structural relationships tested in the study.

3. Materials and Methods

3.1. Sampling and Data Collection

To empirically evaluate the proposed conceptual model, a quantitative research design was deployed utilizing a structured, self-administered online questionnaire. The target population comprised Generation Z adults aged 18–29 years. Data collection was carried out over March to April 2026 period using digital communication channels, including social media networks, university student platforms popular among young people. A question at the beginning of the survey was used to verify that participants fell within the required age bracket. Out of the total responses collected, a final sample of N = 354 valid questionnaires were retained for statistical analysis after filtering out incomplete or unengaged forms. This sample size comfortably exceeds the minimum empirical requirements for partial least squares structural equation modeling (PLS-SEM), safely satisfying both the traditional "10-times rule" and statistical power demands for structural paths with multi-dimensional variables (Hair et al., 2019). Participation was voluntary and anonymous, and informed consent was obtained from all participants before they accessed and completed the questionnaire. Ethical approval was obtained from the Research Ethics Committee of the International Hellenic University.

3.2. Questionnaire Design and Operationalization

The survey instrument combined direct item adoption with multi-source contextual adaptation to capture the intersection of digital technology and sustainability among young consumers. All latent construct items were measured using a standard 7-point Likert scale, ranging from 1 ("Strongly Disagree") to 7 ("Strongly Agree"). Visit Intention was measured using four items directly adopted from Novianti et al. (2022), as their scale explicitly focuses on choice behaviors in technology-driven destination environments. Conversely, the remaining constructs were not derived from a single existing instrument. Instead, they were adapted by drawing on the conceptual pillars of the Theory of Planned Behavior (Ajzen, 1991) and contemporary literature in sustainable tourism, digital travel behavior, and technology adoption. Specifically, the lower-order dimensions of attitude, subjective norm, and perceived behavioral control were structured following established TPB measurement guidelines. For the Sustainability dimensions (ATT_SUS, SN_SUS, and PBC_SUS), item wording was contextually adapted from prior studies on sustainable tourism and environmentally responsible travel behaviour (Verma & Chandra, 2018; Wang et al., 2018). Similarly, the Smart Technologies dimensions (ATT_TECH, SN_TECH, and PBC_TECH) were developed based on the TPB framework and adapted from research examining technology adoption and digital tourism ecosystems (Ghaderi et al., 2018; Nadee et al., 2024). In contrast, the Visit Intention construct was directly adopted from Novianti et al. (2022). Consequently, the questionnaire reflects a combination of theory-driven construct development and contextual adaptation to the setting of such cultural destinations (Appendices A.1 and A.2).

3.3. Data Analysis Method: Two-Stage PLS-SEM

Statistical analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) via the SmartPLS 4 software package. PLS-SEM was chosen as the most appropriate analytical technique due to its superior capability in handling complex, multi-stage hierarchical configurations, its robustness with non-normal data distributions, and its advanced predictive optimization for target endogenous constructs (Sarstedt et al., 2023; Hair et al., 2017, 2021).

Given that Smart Technologies (TECH) and Sustainability (SUS) were specified as reflective–formative higher-order constructs (HOCs) composed of multiple lower-order

components (LOCs), the Two-Stage Approach was implemented following the methodological recommendations of Sarstedt et al. (2019), Coltman et al. (2008) and Jarvis et al. (2003). At the lower-order level, each dimension, Attitude (ATT), Subjective Norms (SN), and Perceived Behavioural Control (PBC), was modelled reflectively, as the indicators within each dimension represent interchangeable manifestations of the same underlying latent construct. At the higher-order level, however, the three TPB dimensions were specified as formative indicators of their respective second-order construct. This specification is consistent with the conceptual foundations of the Theory of Planned Behavior, according to which attitude, subjective norms, and perceived behavioural control represent theoretically distinct determinants of behavioural intention rather than interchangeable reflections of a single latent factor. Consequently, the dimensions are not required to covary and each captures a unique aspect of the broader construct. The omission of any one dimension would alter the conceptual meaning and domain of the higher-order construct (Jarvis et al., 2003; Coltman et al., 2008; Sarstedt et al., 2019). Accordingly, the higher-order constructs were assessed using procedures appropriate for formative measurement models. Specifically, the evaluation focused on indicator collinearity through the Variance Inflation Factor (VIF) and on the magnitude and statistical significance of the formative indicator weights. Measures of internal consistency reliability and convergent validity, such as Cronbach's alpha, composite reliability, and average variance extracted (AVE), were not assessed at the higher-order level because these criteria are applicable only to reflectively specified constructs (Hair et al., 2022).

In Stage 1, the reflective lower-order models were evaluated, and scores were generated for the three TPB dimensions in both domains. In Stage 2, these scores were used as formative indicators of the corresponding higher-order constructs, and the resulting second-order structural model was used to test the hypothesised direct and mediating relationships. The two-stage approach is particularly appropriate for hierarchical component models because it reduces model complexity and avoids estimation difficulties associated with repeated-indicator specifications, while supporting the assessment of direct and indirect relationships within multidimensional models (Sarstedt et al., 2019; Hair et al., 2021). A supplementary disaggregated analysis was also conducted to examine the relative contribution of the individual TPB dimensions; however, it was used for interpretive purposes only and not for formal hypothesis testing.

3.4. Assessment of Common Method Bias

Because all variables were collected from the same respondents using a single self-administered questionnaire, common method bias was assessed using the full collinearity test proposed by Kock (2015). According to this approach, VIF values below the conservative threshold of 3.3 indicate that neither vertical nor lateral collinearity is problematic and that common method bias is unlikely to threaten the validity of the results. The inner VIF values ranged from 1.000 to 1.236, well below the recommended threshold, indicating that common method bias was not a significant concern in this study.

4. Results

4.1. Demographics

The sample consisted of 354 Generation Z respondents, with females representing 57.1% of the participants and males 42.9%. The mean age was 21.29 years while the majority of respondents were of Greek nationality (94.4%). Regarding employment status, full-time employees constituted the largest group (37.3%), followed by self-employed and part-time employees (21.8% each), whereas students accounted for 14.7% of the sample. In terms of travel behaviour, most respondents reported taking at least one or two leisure trips

annually, with 40.1% travelling twice per year and 27.4% undertaking more than three leisure trips annually. These characteristics indicate a predominantly young, economically active, and travel-engaged sample suitable for examining their perceptions of digitally enhanced cultural destinations.

4.2. Evaluation of the First-Order Measurement Model

Prior to assessing the structural relationships, the reliability and validity of the first-order reflective measurement model were evaluated. Following the recommendations of Hair et al. (2022), the assessment included indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. As presented in Table 1, all constructs demonstrated satisfactory levels of internal consistency and reliability. Cronbach's alpha values ranged from 0.746 (PBC_SUS) to 0.897 (INTENTION), exceeding the recommended threshold of 0.70. Similarly, composite reliability values (ρC) ranged between 0.826 and 0.928, while rho_A values ranged from 0.787 to 0.903, confirming adequate construct reliability across all latent variables. Convergent validity was assessed through the Average Variance Extracted (AVE). All constructs achieved AVE values above the recommended threshold of 0.50, ranging from 0.550 to 0.763. These results indicate that each construct explains more than 50% of the variance of its indicators, thereby supporting convergent validity. Indicator reliability was evaluated through the examination of outer loadings. Most indicators exceeded the recommended threshold of 0.708. However, ATT_SUS1 (λ = 0.690), ATT_SUS3 (λ = 0.691), SN_SUS4 (λ = 0.613), and PBC_SUS4 (λ = 0.518) exhibited lower loadings. Following Hair et al. (2022), these indicators were retained because the associated constructs continued to demonstrate satisfactory reliability and AVE values above the recommended thresholds, while their retention contributed to preserving the theoretical content validity of the constructs. Discriminant validity was assessed using the Heterotrait–Monotrait Ratio (HTMT). All HTMT values were below the conservative threshold of 0.90, ranging from 0.269 to 0.899, thereby supporting discriminant validity. Although the HTMT value between SN_TECH and ATT_TECH approached the threshold (HTMT = 0.899), it remained below the recommended cut-off value, indicating acceptable construct distinctiveness. In addition, collinearity among indicators was assessed using the Variance Inflation Factor (VIF). All outer VIF values ranged from 1.268 to 3.111, remaining below the recommended threshold of 5.0 (Hair et al., 2022). These findings indicate that multicollinearity was not a concern and that the indicators contributed uniquely to their respective constructs. Considering the above, the first-order measurement model demonstrated satisfactory reliability, convergent validity, and discriminant validity, supporting its suitability for subsequent structural model assessment.

Table 1. First-Order Reflective Measurement Model Assessment.

Construct	α	ρA	ρC	AVE
ATT_SUS	0.794	0.897	0.855	0.599
ATT_TECH	0.819	0.844	0.879	0.646
INTENTION	0.897	0.903	0.928	0.763
PBC_SUS	0.746	0.787	0.826	0.550
PBC_TECH	0.782	0.869	0.851	0.589
SN_SUS	0.788	0.854	0.860	0.610
SN_TECH	0.839	0.857	0.893	0.677

4.3. Evaluation of the Second-Order Measurement Model

Following the assessment of the first-order reflective constructs, the second-order measurement model was evaluated. As Smart Technologies and Sustainability were specified as reflective–formative higher-order constructs (HOCs), their assessment followed established

PLS-SEM guidelines for formative measurement models (Hair et al., 2022; Sarstedt et al., 2019). Accordingly, the evaluation focused on the significance and relevance of the outer weights of the lower-order components (LOCs) and the examination of multicollinearity through the Variance Inflation Factor (VIF).

The results of the formative measurement assessment are presented in Table 2. For TECH, all three lower-order dimensions demonstrated significant contributions. Specifically, Subjective Norms toward Smart Technologies (SN_TECH) exhibited the strongest contribution (weight = 0.589, t = 5.282, $p < 0.001$), followed by Attitude toward Smart Technologies (ATT_TECH) (weight = 0.267, t = 2.424, $p = 0.015$) and Perceived Behavioural Control toward Smart Technologies (PBC_TECH) (weight = 0.251, t = 2.598, $p = 0.009$). For SUS, SN_SUS represented the strongest contributor to the higher-order construct (weight = 0.682, t = 5.581, $p < 0.001$), followed by Perceived Behavioural Control toward Sustainability (PBC_SUS) (weight = 0.384, t = 3.133, $p = 0.002$). Although Attitude toward Sustainability (ATT_SUS) exhibited a positive weight (0.095), its contribution was not statistically significant (t = 0.702, $p = 0.483$). Nevertheless, the dimension was retained due to its theoretical importance within the Theory of Planned Behavior framework and its role in preserving the conceptual completeness of the higher-order construct. Collinearity among the lower-order components was assessed using the Variance Inflation Factor (VIF). All VIF values ranged from 1.389 to 2.614, remaining well below the recommended threshold of 3.3 and the more conservative threshold of 5.0 (Hair et al., 2022). Therefore, multicollinearity was not considered a concern, confirming that each lower-order dimension contributed unique explanatory information to its respective higher-order construct.

Table 2. Formative Assessment of the Higher-Order Constructs.

Higher-Order Construct	Dimension	Weight	t-Value	*p*-Value	VIF
Smart Technologies	ATT_TECH	0.267	2.424	0.015	2.465
Smart Technologies	PBC_TECH	0.251	2.598	0.009	1.967
Smart Technologies	SN_TECH	0.589	5.282	<0.001	2.614
Sustainability	ATT_SUS	0.095	0.702	0.483	1.604
Sustainability	PBC_SUS	0.384	3.133	0.002	1.389
Sustainability	SN_SUS	0.682	5.581	<0.001	1.842

4.4. Main Structural Model and Hypothesis Testing

The structural model was evaluated using 5000 bootstrap subsamples to examine the relationships among TECH, SUS, and INTENTION. The results (Table 3) revealed that TECH exerted a strong positive effect on Intention (β = 0.575, t = 12.232, $p < 0.001$), indicating that stronger technology-related evaluations are associated with higher Visit Intention. Therefore, H1 was supported.

Table 3. Structural Model Results.

Hypothesis	Structural Path	β	t-Value	*p*-Value	Decision
H1	Smart Technologies → Intention	0.575	12.232	<0.001	Supported
H2	Smart Technologies → Sustainability	0.437	7.598	<0.001	Supported
H3	Sustainability → Intention	0.194	3.913	<0.001	Supported

Furthermore, TECH also positively affected SUS (β = 0.437, t = 7.598, $p < 0.001$), suggesting that the adoption of smart technologies enhances perceptions of sustainability within cultural destinations. Consequently, H2 was supported. The findings also indicated that SUS positively affected INTENTION (β = 0.194, t = 3.913, $p < 0.001$). Although the magnitude of this relationship was smaller than that of Smart Technologies, the effect remained statistically significant, providing support for H3. The explanatory power of

the model was satisfactory (Table 4). Smart Technologies and Sustainability jointly explained 46.6% of the variance in Intention (R^2 = 0.466), indicating moderate predictive accuracy. Additionally, Smart Technologies explained 19.1% of the variance in Sustainability (R^2 = 0.191). Effect sizes (f^2) were also examined to assess the substantive contribution of each exogenous construct to the endogenous variables. As shown in Table 4, Smart Technologies exerted a large effect on Visit Intention (f^2 = 0.501) and a medium effect on Sustainability (f^2 = 0.236). In contrast, Sustainability demonstrated only a small effect on Visit Intention (f^2 = 0.057). These findings confirm the dominant explanatory role of the technology construct.

Table 4. Coefficient of Determination (R^2) and Effect Sizes (f^2).

Endogenous Construct	**R^2**	
Intention	0.466	
Sustainability	0.191	
Effect Size (f^2) of Structural Path	**f^2**	**Interpretation**
Smart Technologies → Intention	0.501	Large
Smart Technologies → Sustainability	0.236	Medium
Sustainability → Intention	0.057	Small

4.5. Mediation Analysis

Following established mediation assessment procedures in PLS-SEM (Nitzl et al., 2016; Hair et al., 2022), a non-parametric bootstrapping procedure with 5000 subsamples was performed to estimate the indirect effect, corresponding path coefficients, t-statistics, and significance levels. The results (Table 5) revealed a significant indirect effect of TECH on INTENTION through SUS (β = 0.085, t = 3.596, $p < 0.001$). This finding indicates that Smart Technologies influence behavioural intention not only directly but also indirectly through their positive effect on Sustainability. The direct TECH → INTENTION path remained significant after inclusion of the mediator (β = 0.575, t = 12.232, $p < 0.001$). According to Nitzl et al. (2016), when both the direct and indirect effects are statistically significant and point in the same direction, the mediation is classified as complementary partial mediation. Therefore, Sustainability partially mediates the relationship between Smart Technologies and Intention. Consequently, H4 is supported.

Table 5. Total, Mediation Analysis Results.

Hypothesis	**Indirect Path**	**β**	**t-Value**	***p*-Value**	**Decision**
H4	Smart Technologies → Sustainability → Intention	0.085	3.596	<0.001	Supported

4.6. Disaggregated Analysis of the Lower-Order Components

To complement the higher-order structural model, a disaggregated analysis was conducted to examine the individual relationships between the six lower-order TPB components and Visit Intention. This additional analysis provides a more detailed understanding of the relative contributions of Attitude, Subjective Norms, and Perceived Behavioural Control within the broader Smart Technologies and Sustainability constructs. The assessment included path coefficients (β), statistical significance based on bootstrapping with 5000 subsamples, the coefficient of determination (R^2), and effect sizes (f^2), following Hair et al. (2022). The supplementary model explained 47.2% of the variance in Visit Intention (R^2 = 0.472), indicating moderate explanatory power. The bootstrapping results showed that four of the six lower-order components had statistically significant positive relationships with Visit Intention. SN_TECH demonstrated the strongest direct association with intention (β = 0.369, t = 5.292, $p < 0.001$), followed by PBC_TECH (β = 0.167, t = 2.613,

p = 0.009), PBC_SUS (β = 0.132, t = 2.851, p = 0.004), and SN_SUS (β = 0.128, t = 2.216, p = 0.027) (Table 6).

Table 6. Supplementary Disaggregated Analysis of the Lower-Order Components.

Path	β	t-Value	*p*-Value	f^2
ATT_SUS → INTENTION	−0.042	0.860	0.390	0.002
ATT_TECH → INTENTION	0.102	1.449	0.147	0.008
PBC_SUS → INTENTION	0.132	2.851	0.004	0.023
PBC_TECH → INTENTION	0.167	2.613	0.009	0.026
SN_SUS → INTENTION	0.128	2.216	0.027	0.015
SN_TECH → INTENTION	0.369	5.292	<0.001	0.093

In contrast, ATT_TECH was not significantly related to Visit Intention (β = 0.102, t = 1.449, p = 0.147). Similarly, ATT_SUS exhibited a non-significant and slightly negative relationship with intention (β = −0.042, t = 0.860, p = 0.390). According to Cohen's (1988) guidelines, all statistically significant relationships demonstrated small effect sizes. The largest effect was observed for SN_TECH (f^2 = 0.093), followed by PBC_TECH (f^2 = 0.026) and PBC_SUS (f^2 = 0.023), while the remaining effects were negligible. Overall, the supplementary analysis indicates that Subjective Norms and Perceived Behavioural Control were more strongly associated with Generation Z's Visit Intention than the two Attitude dimensions. In particular, Subjective Norms toward Smart Technologies displayed the strongest individual association, suggesting that peer influence and perceived social approval may be especially relevant to the destination intentions of digitally connected travellers.

4.7. Importance–Performance Map Analysis (IPMA)

To complement the structural model assessment, an Importance–Performance Map Analysis (IPMA) was conducted. IPMA extends conventional path coefficient analysis by simultaneously evaluating the total effects of predecessor constructs (importance) and their average latent variable performance scores, rescaled from 0 to 100, with Visit Intention specified as the target endogenous construct (Ringle & Sarstedt, 2016). This approach provides additional managerial insights by identifying constructs that not only exert the strongest influence on behavioural intention but also offer the greatest potential for improvement. The IPMA results (Table 7, Figure 3) revealed that Smart Technologies exhibited the highest importance for behavioural intention (Importance = 0.660) while achieving a performance score of (60.230). In comparison, Sustainability demonstrated substantially lower importance (0.194) and a slightly lower performance score (59.050). These findings identify Smart Technologies as the most influential determinant of Visit Intention. Overall, the IPMA findings reinforce the structural model results by confirming that the technology construct constitute the primary strategic driver of this cohort's intention to visit such destinations. Consequently, destination managers seeking to strengthen behavioural intention should prioritize investments in smart technological solutions while simultaneously integrating sustainability-oriented initiatives.

Table 7. Importance–Performance Analysis Results.

Construct	Importance	Performance
Smart Technologies	0.660	60.230
Sustainability	0.194	59.050

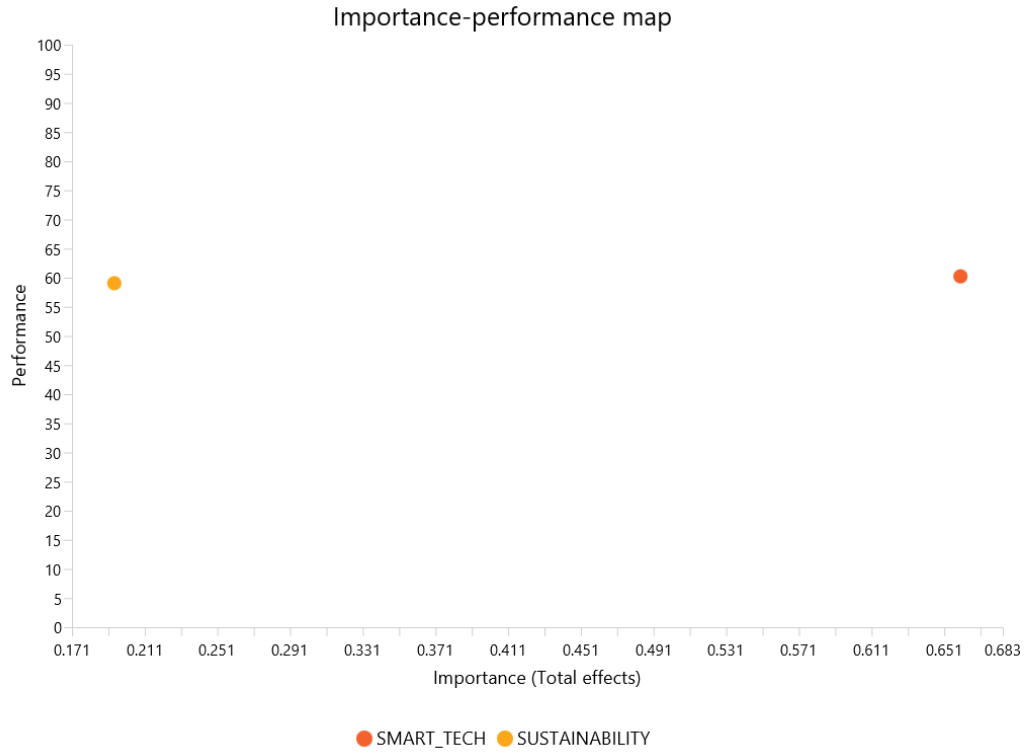


Figure 3. Importance–Performance Map Analysis (IPMA) for the higher-order constructs (Smart Technologies and Sustainability).

4.8. Predictive Assessment

To assess the model's out-of-sample predictive capability, PLSpredict was performed following the guidelines proposed by Shmueli et al. (2019). PLSpredict evaluates whether a PLS-SEM model can accurately predict observations that were not used during model estimation by comparing its prediction errors with those generated by benchmark models. Because predictive assessment is conducted only for endogenous constructs, the analysis focused on SUS and Visit Intention. Accordingly, the manifest-variable results are reported for the indicators of the endogenous higher-order construct Sustainability (ATT_SUS, SN_SUS, and PBC_SUS) and for Visit Intention. TECH and its lower-order components were excluded because the construct was exogenous.

The results presented in Table 8 reveal positive Q^2predict values for all assessed variables, indicating out-of-sample predictive relevance. Q^2predict values ranged from 0.091 to 0.423, with the highest value observed for Visit Intention (Q^2predict = 0.423). Positive Q^2predict values indicate that the PLS-SEM predictions outperform the naïve indicator-average benchmark (Shmueli et al., 2019).

Table 8. PLSpredict Results.

Construct	Q^2Predict	PLS-SEM RMSE	LM RMSE
ATT_SUS	0.091	0.956	0.955
PBC_SUS	0.091	0.956	0.956
SN_SUS	0.163	0.917	0.919
INTENTION	0.423	0.762	0.762

However, comparison with the more conservative linear model benchmark showed broadly comparable prediction errors. For Visit Intention, the PLS-SEM model produced an RMSE of 0.762 and an MAE of 0.594, whereas the linear model produced an identical RMSE of 0.762 and a marginally higher MAE of 0.595. Similar patterns were observed for

the Sustainability indicators. Therefore, the model demonstrates out-of-sample predictive relevance, but its predictive performance is comparable to, rather than clearly superior to, that of the linear benchmark. The statistical significance of these benchmark comparisons was subsequently examined using CVPAT.

4.9. Cross-Validated Predictive Ability Test

To further assess the model's predictive capability, the Cross-Validated Predictive Ability Test (CVPAT) was conducted. CVPAT formally compares the prediction loss of the PLS-SEM model with that of alternative benchmark models (Liengaard et al., 2021). In the present study, the PLS-SEM model was compared with both the Indicator Average (IA) benchmark and the more conservative Linear Model (LM) benchmark. As presented in Table 9, the PLS-SEM model significantly outperformed the IA benchmark for both endogenous constructs. For Sustainability, the PLS-SEM prediction loss was 0.890, compared with 1.005 for the IA benchmark (t = 3.265, $p = 0.001$). For Visit Intention, the corresponding losses were 0.580 and 1.005, respectively (t = 6.455, $p < 0.001$). At the overall model level, the PLS-SEM prediction loss was also significantly lower than the IA loss (t = 5.307, $p < 0.001$). In contrast, the comparison with the linear model revealed no statistically significant differences. For Sustainability, the PLS-SEM and LM prediction losses were both 0.890 (t = 0.114, $p = 0.909$). For Visit Intention, the losses were 0.580 and 0.581, respectively (t = 0.196, $p = 0.845$). The overall comparison was also non-significant (t = 0.150, $p = 0.881$). Taken together, the PLSpredict and CVPAT findings provide a consistent interpretation. The model demonstrates out-of-sample predictive relevance and significantly outperforms the naïve Indicator Average benchmark. However, it does not provide a statistically significant predictive advantage over the Linear Model. Its predictive performance should therefore be characterised as meaningful relative to a naïve benchmark but comparable to that of the more conservative linear benchmark.

Table 9. CVPAT Comparisons with the Indicator Average and Linear Model Benchmarks.

Panel A. PLS-SEM Versus Indicator Average				
Construct	**PLS Loss**	**IA Loss**	**t-Value**	***p*-Value**
Sustainability	0.890	1.005	3.265	0.001
Intention	0.580	1.005	6.455	<0.001
Overall	0.812	1.005	5.307	<0.001
Panel B. PLS-SEM Versus Linear Model				
Construct	**PLS Loss**	**LM Loss**	**t-Value**	***p*-Value**
Sustainability	0.890	0.890	0.114	0.909
Intention	0.580	0.581	0.196	0.845
Overall	0.812	0.813	0.150	0.881

5. Discussion

5.1. Smart Technologies and Visit Intention

For Generation Z, technologically enabled destination features appear to function less as optional enhancements and more as expected conditions of contemporary travel. This helps explain why the technology construct displayed the strongest relationship with Visit Intention in the higher-order model. Digital tools may reduce uncertainty during travel planning and facilitate access to destination information. They may also support more interactive engagement with cultural content. As a result, these tools may strengthen Visit Intention by making the destination appear more accessible. They may also align the visit with the digitally mediated practices familiar to younger travellers. This interpretation is consistent with smart tourism research on artificial intelligence, augmented reality, mobile applications, and smart visitor services (Buhalis & Amaranggana, 2015; Buhalis &

Karatay, 2022; Hasan et al., 2024). The evidence therefore supports H1. It also suggests that technological integration may represent a basic evaluative condition for this cohort rather than an additional destination benefit. The supplementary lower-order results help explain this relationship. Subjective Norms toward Smart Technologies displayed the strongest individual association with Visit Intention. They also made the largest contribution to the higher-order Smart Technologies construct. Generation Z's destination choices are often formed within platform-mediated environments. In these settings, peer recommendations, online communities, social media content, and the approval of significant others influence destination evaluations (Dimitriou & AbouElgheit, 2019; Liu et al., 2023). Technological innovation may therefore become more influential when it is socially visible and collectively endorsed. The strong role of Subjective Norms suggests that technology-related preferences are not based solely on individual evaluations. They are also reinforced through digital social interaction.

Perceived Behavioural Control toward Smart Technologies was also positively associated with Visit Intention in the supplementary analysis. Interest in technologically enhanced destinations may therefore translate into intention when travellers possess the necessary skills, devices, and opportunities to use digital services. In contrast, Attitude toward Smart Technologies was not independently associated with Visit Intention. However, it remained a significant contributor to the higher-order construct. One possible explanation is that favourable attitudes toward digital services are already widespread within this cohort. Such attitudes may therefore be insufficient to differentiate destination choices. Their behavioural relevance may increase when technology is socially endorsed and perceived as accessible and easy to use. This pattern has implications for TPB-based tourism research. The relative importance of Attitude, Subjective Norms, and Perceived Behavioural Control may depend on the destination attribute being evaluated. It may also vary according to the digital characteristics of the traveller group. Further studies should examine whether social influence and perceived feasibility become more salient when technological features are viewed as baseline expectations. Longitudinal and experimental studies could assess whether this pattern remains stable over time. Cross-cultural research could also compare different cultural destinations, generational cohorts, and levels of digital familiarity.

5.2. Smart Technologies and Sustainability

Generation Z may interpret technological capability as a sign that a destination is modern, well organised and prepared to manage tourism pressures. This may explain why positive technology-related evaluations were associated with stronger sustainability-related evaluations. Digital systems are often linked to visitor-flow management, resource monitoring and access to responsible travel information. As a result, technologically advanced destinations may be perceived as better equipped to address overcrowding, environmental pressures and heritage protection. This interpretation is consistent with research that views digital transformation and sustainable destination management as interconnected domains (Ribes & Ivars Baidal, 2018; Bhuiyan et al., 2022; Inmor et al., 2025). The result therefore supports H2. The prominent role of Subjective Norms in both higher-order constructs offers an additional explanation. Evaluations of innovation and responsibility may develop within the same social and digital environments. Peer recommendations, online content and shared destination narratives can present a place as both technologically progressive and responsibly managed. For this cohort, these socially circulated perceptions may strengthen the connection between the two destination attributes. This relationship should not be interpreted as evidence that technology automatically produces sustainable outcomes. The study measured travellers' evaluations rather than the actual environmental or socio-cultural performance of destinations. Digital infrastructures may also involve high

energy use or contribute to the commercialisation of cultural heritage (El Archi et al., 2023; Tan et al., 2025). Further studies could therefore compare perceived sustainability with objective destination indicators. They could also examine whether social endorsement or direct experience with particular technologies explains the observed association.

5.3. Sustainability and Visit Intention

Environmental concern does not always translate directly into destination choice. Travellers may support sustainable tourism while also considering accessibility, cost, convenience, and the expected travel experience (Vilkaite-Vaitone, 2026). This tension helps explain why Sustainability was positively associated with Visit Intention but had a weaker influence than technology construct. Sustainability appears to add value to a destination rather than determining choice on its own. The result supports H3 and aligns with evidence that younger travellers balance responsible tourism preferences with practical and experiential priorities (Robinson & Schänzel, 2019; Djafarova & Foots, 2022; Nowacki et al., 2023; Seyfi et al., 2025). The lower-order findings clarify this pattern. Attitude toward Sustainability was not independently associated with Visit Intention. It was also not a significant contributor to the higher-order Sustainability construct. By contrast, Subjective Norms and Perceived Behavioural Control played a stronger role. Sustainable choices may therefore become more relevant when they are socially supported and perceived as feasible. A favourable personal evaluation may be insufficient when sustainable accommodation, transportation, or destination options appear difficult to identify, access, or afford. This interpretation reflects the attitude–behaviour gap often identified in sustainable tourism (Vilkaite-Vaitone, 2026; Grechi & Minazzi, 2025; Seyfi et al., 2025). The findings also show that the three TPB dimensions should not be assumed to contribute equally to sustainability-related intentions. Their relevance may depend on whether travellers feel socially encouraged and capable of acting on their preferences. Comparative studies could examine whether this pattern differs across traveller groups and destination settings. Research combining stated intentions with observed travel choices would also clarify when sustainability becomes a decisive criterion.

5.4. Mediation Effect of Sustainability

Sustainability appears to provide a secondary pathway linking Smart Technologies with Visit Intention. A destination perceived as technologically capable may also be viewed as more organised, forward-looking and responsible. These broader evaluations can add to its attractiveness among younger travellers. The result supports the view that technology and sustainability may operate as connected elements of destination assessment rather than as isolated attributes (Ribes & Ivars Baidal, 2018; Bhuiyan et al., 2022; El Archi et al., 2023). The mediation was complementary and partial because the direct and indirect effects were both positive and significant (Nitzl et al., 2016; Hair et al., 2022). Sustainability therefore explains only part of the relationship. Technology-related evaluations remained strongly associated with Visit Intention independently of the mediator. Sustainability reinforces this association but does not constitute its main explanatory mechanism. This pattern provides support for H4. The indirect relationship should be interpreted cautiously. The cross-sectional design identifies statistical mediation but does not establish the temporal or causal sequence among the constructs. Further research could examine which digital functions are most likely to shape sustainability evaluations. These may include visitor-flow information, sustainable mobility tools, resource-use transparency and digital communication of heritage-protection practices. Experimental or longitudinal designs would help determine whether exposure to such services produces changes in both Sustainability evaluations and Visit Intention.

5.5. Managerial Implications

The IPMA results provide a clear basis for resource prioritisation. The technology construct showed the highest importance for Visit Intention, while Sustainability had lower importance but a similar performance level. DMOs should therefore prioritise digital services that also make responsible travel choices easier and more visible. Technology and sustainability should be implemented as a single operational strategy rather than as separate initiatives. An integrated destination application could combine smart ticketing, digital navigation and real-time visitor information. Timed-entry systems could regulate access to heavily visited heritage sites. Live occupancy data could redirect visitors to less congested attractions or recommend alternative visiting times. These functions could improve the visitor journey while supporting visitor dispersion and reducing pressure on sensitive cultural areas. The same application could promote public transport, walking and cycling routes. It could display journey times, accessibility information and nearby transport connections. Incentives such as digital rewards or heritage passports could encourage off-peak visits, the use of sustainable transport and exploration beyond the most popular sites. In this way, digital convenience would be directly connected to mobility and crowd-management objectives. AI-supported multilingual assistants could provide personalised cultural information together with practical guidance on responsible behaviour. For example, they could explain site-protection rules, recommend locally owned businesses and direct visitors to recycling or refill facilities. Augmented reality could reconstruct damaged monuments or interpret fragile areas without requiring unrestricted physical access. Digital storytelling could also present local traditions and community perspectives, helping DMOs communicate cultural preservation in an engaging format.

The strong role of Subjective Norms suggests that responsible practices should also be socially visible. DMOs could encourage visitors to share sustainable itineraries, public-transport choices and visits to less congested locations. Peer recommendations and user-generated content may increase the social endorsement of both technological services and responsible destination behaviour. Implementation should be evaluated through measurable indicators. Relevant measures include application adoption, timed-entry compliance, visitor distribution, use of recommended transport routes, engagement with preservation content and referrals to local businesses. These indicators would allow managers to assess whether digital services improve visitor access while also contributing to sustainability and heritage-management objectives.

5.6. Theoretical Contributions

This study contributes to TPB-based tourism research through a hierarchical and attribute-specific application of the theory. The application focuses on digitally enhanced cultural destinations. Conventional TPB studies generally examine Attitude, Subjective Norms, and Perceived Behavioural Control as parallel antecedents of behavioural intention. In the present framework, these components are modelled as reflectively measured lower-order constructs. They form two destination-specific higher-order constructs: Smart Technologies and Sustainability. This operationalisation preserves the conceptual distinction among the three TPB components. It also allows their relative contributions to be compared across technology-related and sustainability-related domains. The framework further examines these two domains as connected rather than independent determinants of Visit Intention. The technology construct was associated with intention both directly and indirectly through the mediator. The mediation result provides context-specific evidence of a link between technology-related evaluations and perceptions of responsible destination management. However, the indirect effect was smaller than the direct effect. Sustainability should therefore be interpreted as a complementary rather than dominant explanatory

mechanism. A further context-specific insight concerns the role of social influence. Subjective Norms emerged as the strongest formative contributor to both higher-order constructs. This finding indicates that the relative importance of the core TPB components may vary across destination attributes and traveller groups. Within the present cultural tourism context, socially endorsed perceptions appear to be more influential than favourable personal evaluations or perceived control alone. The contribution of the framework lies in combining a hierarchical operationalisation of TPB with an integrated technology–sustainability mechanism. The study does not propose a new behavioural theory or a substantive modification of TPB. Instead, it offers a contextual extension of its application. It shows how the established TPB components can be organised around contemporary destination attributes. It also demonstrates how these attributes jointly relate to Visit Intention.

6. Conclusions

Within a TPB-based framework, this study examined how technology- and sustainability-related evaluations shape young adult Generation Z travellers' intention to visit digitally enhanced cultural destinations. The technology construct emerged as the dominant predictor, while the sustainability construct had a smaller positive effect and partially mediated the relationship with intention. These results position digital innovation as the principal driver of destination choice and responsible-destination evaluations as a complementary mechanism. The influence of sustainability-related considerations may therefore be greater when they are embedded within technology-enabled experiences that improve access, engagement, and destination value. The prominence of Subjective Norms across both higher-order constructs also highlights the role of peer recommendations, social media, and online communities in shaping destination evaluations. The study contributes to smart cultural tourism research by clarifying the distinct but connected roles of the two domains. For managers, the findings support prioritising user-centred digital experiences while integrating credible responsible-tourism practices. This approach may strengthen visitor engagement and destination competitiveness.

7. Limitations and Future Research

Several limitations should be acknowledged. First, the use of convenience and snowball sampling may have introduced self-selection and network-related bias. Participants recruited through social media and university-related channels may be more digitally engaged than the wider target population, while snowball sampling may overrepresent respondents with similar demographic and behavioural characteristics. Consequently, the sample cannot be considered statistically representative, and the findings should not be generalised to the cohort as a whole. Future studies should employ probability-based or stratified sampling procedures and recruit participants through more diverse channels. Second, the study relied on self-reported perceptions and behavioural intentions collected through a single questionnaire. Although the full-collinearity assessment indicated that common method bias was unlikely to represent a major concern, self-reported responses may still be affected by social desirability, recall limitations and consistency bias. Moreover, stated Visit Intention may not necessarily translate into actual destination choice. Future research could combine survey data with behavioural measures, such as booking decisions, application usage or recorded destination visits. Third, the sample consisted predominantly of Greek respondents and mainly represented the adult segment of this cohort. The findings may therefore reflect country-specific tourism patterns, economic conditions, digital infrastructure and social norms. Their applicability to younger members of Generation Z and to travellers from other cultural contexts remains limited. Cross-national and cross-cultural studies are needed to assess whether the relative influence of the two higher-order con-

structs and Subjective Norms remains consistent across different destination and traveller contexts. Finally, the cross-sectional design captures perceptions at a single point in time and does not support causal conclusions or changes in behaviour over time. Longitudinal and experimental research could examine how technology- and sustainability-related evaluations evolve and whether they predict actual travel behaviour. Future models could also incorporate variables such as destination image, trust in technology, perceived authenticity, technology readiness and environmental concern.

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Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors on request.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Appendix A.1

Construct	No. of Items	Representative Item	Source
ATT_SUS	4	"Sustainable practices in digitally enhanced cultural destinations enhance the overall travel experience."	Adapted from Ajzen (1991); Verma and Chandra (2018); Wang et al. (2018)
SN_SUS	4	"People important to me think I should choose environmentally sustainable destinations."	Adapted from Ajzen (1991); Verma and Chandra (2018); Wang et al. (2018)
PBC_SUS	4	"I have the necessary resources and knowledge to choose sustainable destinations when travelling."	Adapted from Ajzen (1991); Verma and Chandra (2018); Wang et al. (2018)
ATT_TECH	4	"Smart technologies such as navigation apps and interactive maps make visiting a destination more convenient and enjoyable."	Adapted from Ajzen (1991); Ghaderi et al. (2018); Nadee et al. (2024)
SN_TECH	4	"My peers value destinations that provide innovative technologies such as AR/VR or AI support."	Adapted from Ajzen (1991); Ghaderi et al. (2018); Nadee et al. (2024)
PBC_TECH	4	"I feel confident using smart technologies such as chatbots, AR/VR, or AI when planning my trips."	Adapted from Ajzen (1991); Ghaderi et al. (2018); Nadee et al. (2024)
VISIT INTENTION	4	"I intend to choose a digitally enhanced cultural destination for my next trip."	Adopted from Novianti et al. (2022)

Appendix A.2

Construct	Code	Questionnaire Item	Outer Loading
Attitude toward Sustainability	ATT_SUS1	I believe that choosing a digitally enhanced cultural destination with environmentally friendly accommodation is a good decision.	0.690
	ATT_SUS2	Traveling to digitally enhanced cultural destinations that promote recycling and waste reduction is important to me.	0.825
	ATT_SUS3	Visiting a digitally enhanced cultural destination that supports sustainable transportation (e.g., cycling, public transport) would be a positive experience.	0.691
	ATT_SUS4	Sustainable practices in digitally enhanced cultural destinations enhance the overall travel experience.	0.872
Subjective Norms—Sustainability	SN_SUS1	People important to me think I should choose environmentally sustainable destinations.	0.844
	SN_SUS2	My friends and family support my interest in environmentally friendly travel choices.	0.759
	SN_SUS3	Most of my friends encourage me to visit destinations that implement sustainable practices.	0.881
	SN_SUS4	My friends and family encourage me to care about the environment.	0.613
Perceived Behavioral Control—Sustainability	PBC_SUS1	It is easy for me to find and book environmentally friendly accommodation.	0.810
	PBC_SUS2	I feel confident in my ability to plan a trip that includes sustainable transportation options.	0.815
	PBC_SUS3	I have the necessary resources and knowledge to choose sustainable destinations when traveling.	0.783
	PBC_SUS4	I feel confident that if I want to, I can visit sustainable destinations.	0.518
Attitude toward Smart Technologies	ATT_TECH1	I believe that using augmented/virtual reality (AR/VR) to preview a destination increases my interest in visiting it.	0.846
	ATT_TECH2	AI-based chatbots (e.g., for hotel or destination information) improve my travel planning experience.	0.785
	ATT_TECH3	Smart technologies such as navigation apps and interactive maps make visiting a destination more convenient and enjoyable.	0.724
	ATT_TECH4	I believe that providing smart services should be a priority for cultural tourism destinations.	0.854
Subjective Norms—Technology	SN_TECH1	People important to me expect me to use technology when planning or experiencing a trip.	0.700
	SN_TECH2	My peers value destinations that provide innovative technologies such as AR/VR or AI support.	0.854

Construct	Code	Questionnaire Item	Outer Loading
	SN_TECH3	I feel encouraged by others to engage with technology-based travel experiences (e.g., virtual previews, app-based tours).	0.866
	SN_TECH4	My friends and acquaintances believe that using smart technologies is essential for a modern and quality travel experience.	0.859
Perceived Behavioral Control—Technology	PBC_TECH1	I feel confident using smart technologies such as chatbots, AR/VR, or AI when planning my trips.	0.836
	PBC_TECH2	I have the necessary skills and devices to use mobile travel apps and digital tools while traveling.	0.733
	PBC_TECH3	Using smart technologies for travel planning or exploration is easy and accessible for me.	0.781
	PBC_TECH4	I can easily integrate smart technologies (e.g., navigation apps, digital guides) into my travel experience.	0.716
Visit Intention	INT1	Digitally enhanced cultural destinations offer more compared to traditional ones, providing more experiences and enjoyment.	0.843
	INT2	I will choose digitally enhanced cultural destinations for future trips.	0.892
	INT3	Digitally enhanced cultural destinations are better than traditional ones.	0.851
	INT4	I intend to choose a digitally enhanced cultural destination for my next trip.	0.897

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