



Smart Technologies in Festival Experiencescapes: Personalization Receptivity, Anticipated Immersion, and Loyalty Intentions

Tecnologías inteligentes en los *experiencescapes* de festivales: receptividad hacia la personalización, inmersión anticipada e intenciones de lealtad

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Received: 26.04.2026; Revisions required: 15.07.2026; 29.09.2026; Accepted: 02.10.2026; Published: 02.10.2026

Abstract

This study examines how festival attendees' evaluations of smart technologies relate to personalization receptivity, anticipated immersive experience, and technology-contingent loyalty intentions. Using cross-sectional survey data from 338 festival attendees and covariance-based structural equation modeling, the study integrates technology-evaluation and experiencescape perspectives. Perceived usefulness and trust were positively associated with personalization receptivity, which strongly predicted anticipated immersive experience. Both anticipated immersion and personalization receptivity were positively associated with loyalty intentions, and a partial-mediation model fitted the data better than a full-mediation specification. Privacy concerns showed a small positive association with personalization receptivity, contrary to expectations, but this result was sensitive to model specification. The findings extend the experiencescape perspective by showing how technology appraisals, personalization receptivity, and anticipated immersion can operate as interconnected routes to loyalty-related responses. For festival managers, the results suggest that functional, personalized, and immersive technologies should be managed according to the distinct forms of value they are expected to create. Findings represent associations among expectations and intentions rather than causal effects or observed behavior.

Keywords: smart festival technologies; experiencescape; personalization receptivity; anticipated immersive experience; privacy concerns; loyalty intentions.

Resumen

Este estudio examina cómo las valoraciones de los asistentes a festivales sobre las tecnologías inteligentes se relacionan con la receptividad hacia la personalización, la experiencia inmersiva anticipada y las intenciones de lealtad condicionadas por la tecnología. A partir de una encuesta transversal a 338 asistentes y mediante modelización de ecuaciones estructurales basada en covarianzas, el estudio integra las perspectivas de evaluación tecnológica y de *experiencescape*. La utilidad percibida y la confianza se asociaron positivamente con la receptividad hacia la personalización, que predijo fuertemente la experiencia inmersiva anticipada. Tanto la inmersión anticipada como la receptividad hacia la personalización se asociaron positivamente con las intenciones de lealtad, y el modelo de mediación parcial mostró un mejor ajuste que el de mediación completa. Las preocupaciones por la privacidad mostraron una pequeña asociación positiva con la receptividad hacia la personalización, contrariamente a lo esperado, aunque este resultado fue sensible a la especificación del modelo. Los hallazgos amplían la perspectiva del *experiencescape* al mostrar cómo las valoraciones tecnológicas, la personalización y la inmersión anticipada pueden actuar como vías interrelacionadas hacia respuestas de lealtad. Para los gestores de festivales, los resultados sugieren gestionar las tecnologías funcionales, personalizadas e inmersivas según el valor específico que se espera que generen. Los resultados representan asociaciones entre expectativas e intenciones, no efectos causales ni comportamientos observados.

Palabras clave: tecnologías inteligentes en festivales; *experiencescape*; receptividad hacia la personalización; experiencia inmersiva anticipada; preocupaciones por la privacidad; intenciones de lealtad.

1. Introduction

Across tourism and hospitality, digital infrastructures increasingly shape how visitors access information, navigate spaces, coordinate participation, and engage with experiences in real time (Mieli et al., 2024; Sinanan & Ritter, 2024). In live-event settings, digital systems have become increasingly embedded in how attendees plan, navigate, and interpret participation (Cimbaljević et al., 2021; Santos et al., 2024). In this study, "smart event technologies" is used as an umbrella term covering heterogeneous digital systems, including digital tickets, QR codes, RFID, mobile applications, navigation tools, AI-based services, live streaming, AR/VR, robots, and metaverse-related interfaces. These technologies differ substantially in function and experiential properties; therefore, they are not assumed to operate through a single mechanism.

The research gap lies in the limited integration between technology-evaluation research and experiential research in event settings. Technology-oriented studies have typically examined beliefs such as perceived usefulness, trust, privacy concerns, and continued use intentions (Davis, 1989; Jeong & Shin, 2020; Femenia-Serra et al., 2022), whereas tourism and event research has emphasized experiential quality, *experiencescapes*, immersion, satisfaction, and loyalty-related outcomes (Pizam & Tasci, 2019; Sisson & Alcorn, 2022; Molina-Gómez et al., 2021). Existing work, therefore, explains either how users evaluate digital systems or how experiences



relate to post-experience responses, but less clearly how technology-related evaluations are associated with anticipated experiential responses and loyalty intentions within a festival setting. The present study addresses this gap by connecting these perspectives rather than claiming a new theoretical extension.

Festivals provide a relevant context because digital mediation is intertwined with spatial complexity, multiple simultaneous choices, crowding, and time-sensitive participation (Ryan et al., 2020; Duignan et al., 2018; Wood & Kinnunen, 2020). Digital tools can support planning, navigation, information access, and personalization, while immersive interfaces may contribute to involvement and engagement (Van Winkle et al., 2018; Chen, Jung, & Cai, 2025; García Revilla et al., 2023; Dieck et al., 2021). However, respondents in this study were not asked to evaluate a specific technology or a clearly identified festival. Different participants may therefore have had different technologies, events, and prior experiences in mind. The focal constructs should consequently be interpreted as generalized evaluations and anticipated responses to technology-enabled festival experiences rather than as reports of a single digital encounter.

Against this background, the study examines whether perceived usefulness, trust in smart technologies, and privacy concerns are associated with personalization receptivity; whether personalization receptivity is associated with anticipated immersive experience; and whether anticipated immersion is associated with technology-contingent loyalty intentions. The analysis uses survey data from 338 festival attendees and covariance-based structural equation modeling. The study contributes by integrating established technology-evaluation and experiencescape perspectives within a festival context and by testing whether receptivity to personalization and anticipated immersion are part of the association between technology-related evaluations and loyalty intentions. Its contribution is therefore interpretive and contextual: it examines how familiar constructs operate together in a heterogeneous, technology-enabled festival setting while explicitly recognizing that the evidence concerns stated expectations and intentions rather than observed technology use, experienced immersion, or actual loyalty behavior. This framing also avoids assuming that technological sophistication alone creates experiential or loyalty-related value for attendees.

2. Literature review

2.1 Technology-enabled festival experiencescapes

Technologies increasingly play a role in how festival experiences are organized and interpreted (Ryan et al., 2020; Sjukriana et al., 2025; Chen, Jung, & Cai, 2025). Smart technologies should therefore be understood not as isolated service tools, but as elements embedded in the wider festival experience.

The experiencescape perspective provides the contextual framework for this study. It views tourism experiences as emerging from the interaction between the visitor and the surrounding experiential environment (Bitner, 1992; O'Dell, 2005; Pizam & Tasci, 2019). Han-Long and Wengel (2026) further show that digital mediation can become part of this environment by shaping how visitors anticipate, navigate, personalize, and interpret their participation.

This perspective is particularly relevant to festivals, where attendees navigate complex environments and repeatedly choose how to participate (Cimbaljević et al., 2021; Van Winkle et al., 2018; Duignan et al., 2018). Digital technologies can therefore be conceptualized as touchpoints within the broader festival experiencescape. These technologies are heterogeneous and may contribute to the event experience in different ways (Urul & Holmes, 2025). The present study does not classify them into fixed categories or assume that they are functionally equivalent. Instead, it examines attendees' general evaluations and expectations of smart technologies within a technology-enabled festival environment.

The experiencescape perspective serves as the integrative lens linking the technological and experiential components of the model. The present framework, therefore, integrates experiencescape research with research on technology acceptance, trust, privacy, personalization, immersion, and loyalty intention. Accordingly, the model does not assume that technology itself produces immersion or loyalty; instead, it examines how evaluations of technological touchpoints are associated with anticipated experiential and conative responses within the wider festival experiencescape.

2.2 Technology appraisals as antecedents of personalization receptivity

In a technology-enabled experiencescape, the availability of digital touchpoints does not necessarily imply that attendees will consider them valuable. Attendees' responses to technology-enabled festival environments are likely to depend on whether digital touchpoints are perceived as useful, trustworthy, and appropriate in their handling of personal information (Jeong & Shin, 2020; Ozturk et al., 2021). These evaluations become especially relevant when technologies provide personalized services, since tailored recommendations and customized features require attendees to perceive sufficient value in the technology and to feel confident in how it operates and uses their personal data.

Perceived usefulness refers to the extent to which attendees believe that smart technologies can make festival participation more effective, convenient, manageable, or valuable. In festivals, usefulness may arise from support for navigation, schedule planning, access to relevant content, real-time information, or the reduction of uncertainty during the event (Tantis et al., 2020; Van Winkle



et al., 2018). Technologies perceived as useful may consequently be regarded as better able to support individualized participation because they help attendees filter information and organize the festival environment around their own needs and preferences. Within an experiencescape perspective, usefulness therefore reflects not only the functional performance of an isolated device but also whether technological touchpoints can contribute meaningfully to the attendee's interaction with the wider festival environment.

H1a. Perceived usefulness of smart festival technologies is positively associated with personalization receptivity.

Trust represents a second appraisal through which smart technologies may become experientially meaningful. In digitally mediated settings, attendees depend on technologies and their providers to deliver information, complete transactions, provide recommendations, and manage personal data (Gefen et al., 2003; Hua et al., 2021). When users believe that technological systems will operate reliably and that providers will act appropriately, uncertainty surrounding technology-mediated interaction is reduced. Trust is particularly relevant to personalization because personalized services require attendees to accept that information about their preferences can be used appropriately. Trusted technological touchpoints may therefore be regarded as more legitimate and dependable mechanisms for adapting the festival environment to individual needs.

H1b. Trust in smart festival technologies is positively associated with personalization receptivity.

Privacy concerns introduce a different evaluation. Smart and personalized services may rely on the collection, processing, or sharing of personal, behavioral, and location-related information. Concerns about these practices can reduce willingness to disclose data and engage with data-dependent services (Malhotra et al., 2004; Ioannou et al., 2020; Femenia-Serra et al., 2022).

From a privacy calculus perspective, individuals evaluate personalized services by balancing their expected benefits against the perceived risks of using personal data. Privacy concerns do not necessarily eliminate interest in personalization, and both may coexist when the perceived benefits are sufficiently valuable (Ciftci et al., 2024). Nevertheless, greater concern about data collection and control increases the perceived cost of engaging with personalized services. Accordingly, stronger privacy concerns are expected to be associated with lower personalization receptivity.

H1c. Privacy concerns regarding smart festival technologies are negatively associated with personalization receptivity.

2.3 Personalization receptivity and anticipated immersive experience

Personalization is one way digital technologies can make tourism and event environments more relevant to individual users. In smart tourism contexts, personalization may involve tailored recommendations, preference-sensitive content, customized schedules, context-aware notifications, route suggestions, and other forms of adaptive guidance (Koo et al., 2025; Jeong & Shin, 2020; Yang et al., 2024). Such features can help individuals reduce information overload and focus their attention on activities that more closely align with their interests.

The construct examined in the present study, however, does not represent personalization already received through a particular technological system. The measurement items primarily capture respondents' desire for, appreciation of, and perceived value of personalized technological features. The construct is therefore conceptualized as personalization receptivity: attendees' openness to and anticipated value of having technological touchpoints adapt the festival experience to individual preferences.

This distinction is important within an experiencescape framework because personalization concerns how attendees imagine configuring their interaction with the wider environment, rather than merely how they evaluate a technical feature (Hardy et al., 2017; Du et al., 2019). In complex festival environments, personalized information may help attendees focus on personally meaningful activities and construct a more coherent experience from multiple simultaneous possibilities.

The relationship between personalization and immersion can also be situated within the experiencescape perspective. Han-Long and Wengel (2026) show that personalization can emerge through the ways visitors adapt routes, practices, and activities to their own interests, while immersion develops through deeper sensory, embodied, and social engagement with the environment. In the present context, greater receptivity to technologies that make the festival environment more personally relevant may therefore be associated with stronger anticipated involvement and emotional connection.

H2. Personalization receptivity is positively associated with anticipated immersive experience.

2.4 Anticipated immersive experience and technology-contingent loyalty intentions

Immersion refers to a state of focused involvement in which attention, affect, and experiential engagement become concentrated on an encounter (Steuer, 1992; Chen et al., 2025). In an experiencescape, immersion can arise through the interaction of sensory, social, spatial, and mediated elements rather than from any single touchpoint in isolation (Han-Long & Wengel, 2026).

The present study measures anticipated rather than directly observed immersion. Respondents evaluate the extent to which smart and immersive festival technologies would enhance feelings of involvement, presence, and emotional connection. Anticipated



immersive experience, therefore, captures the expected experiential response to a technology-enabled festival environment rather than an immersive state documented during a specific event.

More engaging tourism and event experiences are frequently associated with favorable post-experience responses, including recommendation and revisit intentions (Oliver, 1999; Lee et al., 2012; Sisson & Alcorn, 2022). Within festival settings, engaging and memorable experiences have also been linked to positive word-of-mouth and intentions to return (Wood & Kinnunen, 2020; Lopes et al., 2026). Accordingly, this study focuses on technology-contingent loyalty intentions, understood as stated intentions to revisit or recommend a festival when smart technologies are effectively integrated. This framing captures a conative response rather than observed repeat behavior.

H3. Anticipated immersive experience is positively associated with technology-contingent loyalty intentions.

2.5 Indirect associations and alternative mediation specifications

The proposed relationships also imply indirect associations with technology-contingent loyalty intentions. Personalization receptivity is expected to be positively associated with loyalty intentions through the anticipated immersive experience.

H4. Personalization receptivity is positively indirectly associated with technology-contingent loyalty intentions through anticipated immersive experience.

Perceived usefulness and trust are also expected to show positive sequential indirect associations with loyalty intentions through personalization receptivity and anticipated immersive experience. Because privacy concerns are hypothesized to be negatively associated with personalization receptivity, the corresponding sequential indirect association is expected to be negative.

H5a. Perceived usefulness is positively indirectly associated with technology-contingent loyalty intentions through personalization receptivity and anticipated immersive experience.

H5b. Trust in smart festival technologies is positively indirectly associated with technology-contingent loyalty intentions through personalization receptivity and anticipated immersive experience.

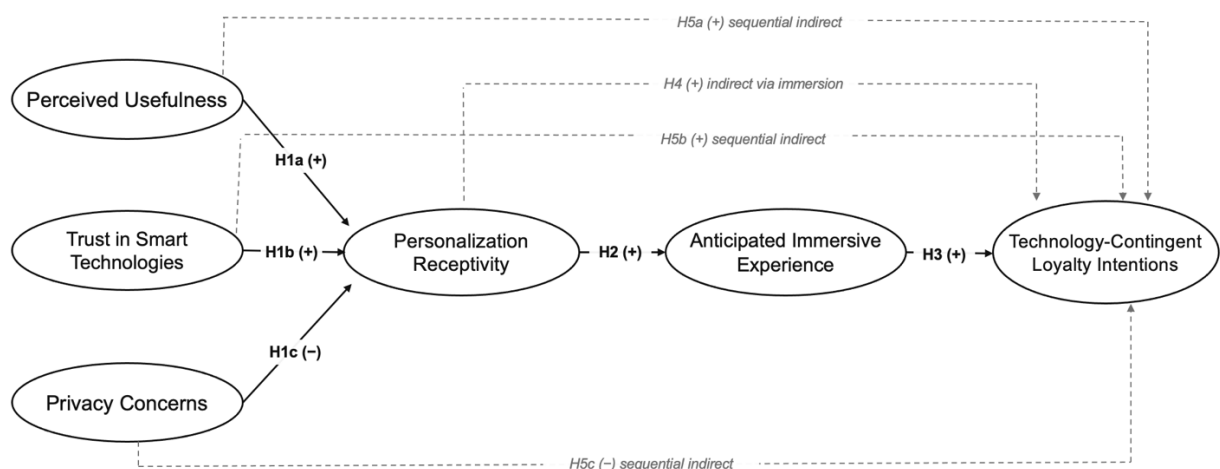
H5c. Privacy concerns are negatively indirectly associated with technology-contingent loyalty intentions through personalization receptivity and anticipated immersive experience.

Personalization may also be relevant to loyalty intentions because technology-enabled experiences perceived as more responsive to individual preferences may be more personally valuable (Koo et al., 2025; Yang et al., 2024). This provides a theoretical basis for considering a direct association with revisit and recommendation intentions in addition to the indirect pathway through anticipated immersion (Jeong & Shin, 2020; Sisson & Alcorn, 2022).

The empirical analysis, therefore, compares a full-mediation specification with a partial-mediation alternative that includes a direct personalization-receptivity–loyalty-intentions path.

Given the cross-sectional design, the proposed indirect relationships are interpreted as model-implied associations rather than as evidence of a temporal psychological process.

Figure 1 - Research model



Source: own development.



3. Methodology

3.1 Sample and data collection

Data were collected between November 2025 and February 2026 through an online questionnaire administered using Google Forms. A non-probability purposive sampling strategy was employed. Recruitment began by directly contacting approximately 90 potential participants through social media and university networks. The questionnaire was subsequently disseminated more broadly through social-media channels, university networks, and online communities related to live festivals. Because the survey link was distributed through open online channels and participation was anonymous, the total number of individuals who viewed the invitation or opened the questionnaire could not be determined.

The questionnaire was administered in Spanish. To ensure contextual relevance, respondents were required to confirm that they had attended at least one live festival during the previous two years. This two-year attendance criterion was used as an eligibility condition. Respondents were not instructed to answer with reference to one specific or most recent festival; instead, the questionnaire referred to festivals in general. Consequently, responses may reflect experiences and expectations shaped by different events within the eligibility period, introducing potential variation in recall and in the festival context that respondents had in mind.

The final analytical sample consisted of 338 eligible respondents. The sample was predominantly young and Spain-centered: 75.1% of respondents were aged 18–29 years, 80.8% were Spanish, 56.5% were students, and 87.6% reported attending music festivals. Festival type was assessed as a multiple-response question, allowing respondents to select more than one festival category; therefore, percentages across festival types do not sum to 100%. Specific festival names were not collected, and respondents were not anchored to a single event, so the number of unique festivals represented in the sample cannot be determined. Accordingly, the sample should be interpreted as a contextualized festival-attendee sample rather than as representative of the broader population of event attendees.

Previous exposure to smart or emerging technologies in festival settings was also recorded. Respondents who reported having used such technologies once, sometimes, or frequently were classified as prior users ($n = 216$). In contrast, respondents who reported never having used smart technologies at festivals were classified as non-users ($n = 122$). Thus, 36.1% of the analytical sample had no prior direct experience with smart festival technologies. This distinction was subsequently incorporated into the robustness analyses.

The technology-use section covered a broad range of digital systems, including digital tickets, QR codes, RFID wristbands or wearables, official festival applications, live-streaming services, GPS-based festival maps, interactive screens and installations, AI-based systems, augmented reality (AR), virtual reality (VR), robots, and metaverse-related interfaces. These technologies were treated as a heterogeneous umbrella category rather than as functionally equivalent systems. In particular, functional technologies such as ticketing, QR codes, RFID, and navigation tools differ from explicitly immersive or interactive technologies such as AR, VR, and interactive installations. Respondents were not required to select a single technology as a common referent for all subsequent scale items. The focal measures, therefore, capture generalized evaluations and expectations regarding smart technologies in festival settings rather than evaluations of a single common technological interface.

Participation was voluntary and anonymous. Before accessing the questionnaire, respondents were provided with information about the study and required to confirm that they had read the information, voluntarily consented to participate, and understood that they could discontinue the questionnaire at any time. Data were collected through Google Forms without recording respondents' names or email addresses, and IP addresses were not retained in the analytical dataset. Only non-identifying response data were used for the analyses.

The main demographic and technology-exposure characteristics of the sample are presented in Table 1.

3.2 Questionnaire and measures

The questionnaire was designed to operationalize six reflective latent constructs using multi-item measures adapted from established scales in prior research. All focal items were measured on seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived usefulness was measured using four items adapted from technology acceptance research in digital and event-related contexts (Davis, 1989; Bär et al., 2025). The items assessed the extent to which respondents considered smart festival technologies useful for enhancing enjoyment, navigation, planning, and the overall quality of the festival experience. Trust in smart technologies was measured with three items adapted from Gefen et al. (2003), capturing confidence in technological reliability, protection of personal information, and the extent to which festival organizers were perceived to use smart technologies in attendees' interests. Privacy and data concerns were measured using three items adapted from Malhotra et al. (2004), focusing on the collection, use, and sharing of personal data.



Personalization receptivity was measured with four items adapted from prior research on personalization in smart tourism technologies (Koo et al., 2025; Jeong & Shin, 2020). In the present study, the adapted items primarily captured respondents' desire for, appreciation of, and perceived value of personalized recommendations and user-controlled customization.

Anticipated immersive experience was measured with three items adapted from Chen et al. (2025). The adapted items used in the present study were predominantly prospective. They assessed the extent to which smart technologies would make respondents feel immersed, emotionally connected, and more involved in a festival environment. The construct is therefore interpreted as anticipated immersive experience, referring to respondents' expectations regarding the immersive potential of smart festival technologies.

Technology-contingent loyalty intentions were measured with three items adapted from Lee et al. (2012) and Jeong and Shin (2020). The items captured respondents' stated intentions to revisit and recommend festivals when smart technologies were provided or effectively integrated into the event experience. This distinction is particularly relevant because prior use of smart festival technologies was not required to answer the focal scales. Respondents without direct prior use could therefore evaluate the expected implications for usefulness, personalization, immersion, and loyalty of such technologies based on the prospective wording of the items. The focal constructs should consequently be interpreted as generalized technology-related evaluations and anticipated responses rather than as reports of a single experienced technological encounter. A full list of measurement items, construct operationalizations, and source scales is provided in Appendix Table A1.

The original measurement items were drawn from English-language scales and adapted into Spanish for the festival context. The adaptation process focused on preserving the conceptual meaning of the source items while ensuring linguistic clarity and contextual relevance. The Spanish wording was independently reviewed by two researchers, who compared the adapted items with the English-language originals and resolved wording discrepancies through discussion.

Before the main data collection, the questionnaire was piloted with 45 participants aged between 18 and 30 years. The pilot focused on item clarity, comprehensibility, contextual appropriateness, and questionnaire flow. Feedback obtained during the pilot and subsequent researcher review led to minor wording adjustments before the final questionnaire was distributed.

Potential conceptual overlap between trust and privacy was also considered. One trust item explicitly referred to the protection of personal information. For this reason, an additional sensitivity analysis examined whether the privacy-personalization coefficient changed when this information-protection item was excluded from the trust measure.

Because all focal variables were collected from the same respondents using a single self-report questionnaire, common-method variance cannot be ruled out. Procedural safeguards included anonymous and voluntary participation, the use of established multi-item measures, questionnaire piloting, researcher review of wording, and the absence of directly identifying information. These procedures were intended to reduce ambiguity and evaluation apprehension.

Table 1 - Sample characteristics

Categories		n	%
Gender	Female	192	56.8
	Male	140	41.4
	Non-binary	2	0.6
	Prefer not to say	4	1.2
Age	18-29	254	75.1
	30-39	53	15.7
	40-49	15	4.4
	50 and above	16	4.7
Nationality	Spanish	273	80.8
	Other	65	19.2
Employment status	Student	191	56.5
	Employed full-time	84	24.9
	Employed part-time	25	7.4
	Self-employed	16	4.7
	Unemployed and looking for work	9	2.7
	Unemployed and not looking for work	3	0.9
	Homemaker/caregiving responsibilities	3	0.9
	Retired	2	0.6
	Other	5	1.5
Exposure to smart technology use at festivals	No, I have never used any smart technology at festivals	122	36.1
	Yes, sometimes (at some festivals)	122	36.1
	Yes, frequently (at most festivals I have attended)	57	16.9
	Yes, only once (at one festival)	37	10.9

Source: survey's data.



3.3 Data analysis

The analyses were conducted using covariance-based structural equation modeling (CB-SEM) in R with the *lavaan* package (Rosseel, 2012). CB-SEM was selected because the study tests a theoretically specified latent-variable model and requires the simultaneous assessment of measurement quality, structural associations, indirect effects, and overall model fit. All six focal constructs were modeled as reflective latent variables. No missing values were observed across the 20 focal measurement items; therefore, all 338 cases were retained, and no missing-data estimation procedure was required.

An a priori power analysis was conducted using G*Power 3.1 (Faul et al., 2009) as an equation-level benchmark for the most demanding regression equation in the structural model. The analysis specified a linear multiple regression with three predictors, a medium effect size ($f^2 = 0.15$), $\alpha = 0.01$, and 0.99 statistical power. The resulting minimum sample size was 205. The final sample of 338 respondents therefore exceeded this benchmark. This calculation was used as a reference for the structural regressions rather than as a power analysis of the complete SEM.

The analysis proceeded first with a confirmatory factor analysis (CFA) to assess the measurement model. Standardized factor loadings, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) were examined to assess indicator reliability, internal consistency, and convergent validity. CR values above 0.70 and AVE values above 0.50 were used as reference criteria (Fornell & Larcker, 1981). Discriminant validity was assessed using latent-construct correlations and the heterotrait-monotrait ratio (HTMT), with values below 0.85 used as a conservative reference (Henseler et al., 2015). Bootstrap confidence intervals were additionally obtained for HTMT estimates.

The CFA and structural models were estimated using robust maximum likelihood (MLR) to account for potential departures from multivariate normality. Model fit was evaluated using the scaled chi-square statistic, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) with its 90% confidence interval, and standardized root mean square residual (SRMR). These indices were interpreted jointly rather than through a single strict cutoff (Hu & Bentler, 1999).

The structural analysis examined the hypothesized associations among perceived usefulness, trust in smart technologies, privacy concerns, personalization receptivity, anticipated immersive experience, and technology-contingent loyalty intentions. Standardized path coefficients (β), robust standard errors, confidence intervals, coefficients of determination (R^2), and effect sizes (f^2) were reported.

Because the theoretical model proposed indirect associations, two structural specifications were compared. The initial full-mediation model specified the personalization-receptivity-loyalty relationship exclusively through anticipated immersive experience. A partial-mediation model additionally included a direct path from personalization receptivity to technology-contingent loyalty intentions. The two nested specifications were compared using the scaled chi-square difference test, together with changes in AIC, BIC, and global fit indices. The better-supported specification was retained for interpretation.

Indirect and total associations were evaluated using 5,000 bootstrap resamples. Because nonparametric bootstrap confidence intervals and MLR estimation are not combined within the same lavaan estimation, a separate maximum-likelihood model with the same structural specification was used to obtain percentile bootstrap confidence intervals for the indirect effects. These effects are reported as unstandardized coefficients (B) with 95% percentile bootstrap confidence intervals (Preacher & Hayes, 2008). Given the cross-sectional design, they are interpreted as model-implied indirect associations rather than evidence of a temporal causal process.

Several supplementary analyses were conducted to assess the robustness of the findings. First, the retained structural model was estimated separately for respondents with prior smart-technology use at festivals and those reporting no previous use. Configural and metric measurement invariance were assessed before comparing the focal structural paths across groups (Putnick & Bornstein, 2016). An omnibus equality test was then used to examine whether the structural coefficients differed between prior users and non-users.

Second, the unexpected privacy-personalization association was examined using zero-order latent correlations, variance inflation factors, alternative predictor specifications, and a sensitivity analysis that excluded the trust item that explicitly referred to the protection of personal information. Prior use of smart technology and self-reported adaptation to new technologies were also introduced as control variables to examine whether the focal structural relationships remained stable.

Finally, a broader alternative structural model allowed perceived usefulness, trust, and privacy concerns to relate directly to anticipated immersive experience and loyalty intentions. This specification was used as a sensitivity analysis to assess whether the cross-sectional covariance structure was compatible with alternative structural orderings. Common-method variance was also examined through a single-factor CFA and a latent method-factor sensitivity model (Podsakoff et al., 2003). Modification indices and residual correlations were inspected as model diagnostics, but no residual covariances or cross-loadings were introduced solely to improve model fit.



4. Results

4.1 Measurement model

A confirmatory factor analysis (CFA) was conducted to assess the measurement model. The proposed six-construct measurement model showed an adequate fit to the data based on the robust MLR indices: scaled $\chi^2(155) = 343.930$, $\chi^2/df = 2.219$, $r CFI = 0.952$, $TLI = 0.941$, $RMSEA = 0.067$, 90% CI [0.058, 0.077], and $SRMR = 0.055$. These results indicate that the six-construct measurement structure provided an adequate representation of the data. Appendix Table A2 reports the descriptive statistics and standardized factor loadings for all measurement items.

The standardized factor loadings ranged from 0.661 to 0.921. All items except one perceived usefulness item (PU2; loading = 0.661) exceeded the commonly used 0.70 reference value. This item was retained because its loading remained acceptable and the reliability and convergent validity indices for perceived usefulness were above the recommended thresholds.

The composite reliability (CR) values were 0.868 for perceived usefulness, 0.846 for trust in smart technologies, 0.931 for privacy and data concerns, 0.889 for personalization receptivity, 0.896 for anticipated immersive experience, and 0.902 for technology-contingent loyalty intentions. Since all CR values exceeded the recommended threshold of 0.70, the internal consistency of the constructs was supported. Cronbach's alpha values also ranged from 0.842 to 0.931, further indicating satisfactory internal consistency.

The average variance extracted (AVE) values were 0.623 for perceived usefulness, 0.648 for trust, 0.819 for privacy and data concerns, 0.667 for personalization receptivity, 0.741 for anticipated immersive experience, and 0.754 for loyalty intentions. All AVE values exceeded 0.50, supporting convergent validity. Table 2 summarizes the reliability and convergent validity results.

Table 2 - Reliability and convergent validity of the measurement model

Construct	AVE	CR	Alpha
Perceived Usefulness (PU)	.623	.868	.867
Trust in Smart Technologies (CONF)	.648	.846	.842
Privacy and Data Concerns (PRIVC)	.819	.931	.931
Personalization Receptivity (PERS)	.667	.889	.884
Anticipated Immersive Experience (INM)	.741	.896	.894
Technology-contingent Loyalty Intentions (LOY)	.754	.902	.897

Source: own development.

Discriminant validity was assessed using latent-construct correlations and the heterotrait-monotrait ratio (HTMT). Table 3 reports the latent correlations and HTMT estimates with their confidence intervals. The latent correlations showed that the strongest relationship was between anticipated immersive experience and loyalty intentions ($r = 0.753$, 95% CI [0.686, 0.821]). In contrast, the zero-order correlation between privacy and data concerns and personalization receptivity was small and positive ($r = 0.166$, 95% CI [0.025, 0.307]).

The HTMT values ranged from 0.081 to 0.773, all below the recommended threshold of 0.85. The highest HTMT value was observed between anticipated immersive experience and loyalty intentions (HTMT = 0.773; 95% bootstrap CI: [0.708, 0.829]). Importantly, the upper limits of all bootstrap confidence intervals were also below 0.85. Therefore, the results support discriminant validity among the six constructs.

Table 3 - Latent correlations and HTMT assessment

Construct pair	Latent correlation (r)	95% CI for r	HTMT	95% bootstrap CI for HTMT
PU-CONF	.530	[.418, .642]	.532	[.407, .638]
PU-PRIVC	.152	[.013, .291]	.151	[.033, .292]
PU-PERS	.645	[.542, .748]	.695	[.597, .770]
PU-INM	.693	[.602, .784]	.643	[.537, .729]
PU-LOY	.721	[.638, .804]	.701	[.605, .783]
CONF-PRIVC	.013	[-.145, .171]	.081	[.039, .148]
CONF-PERS	.627	[.520, .735]	.652	[.544, .741]
CONF-INM	.564	[.454, .674]	.565	[.452, .666]
CONF-LOY	.666	[.572, .760]	.686	[.594, .770]
PRIVC-PERS	.166	[.025, .307]	.171	[.048, .308]
PRIVC-INM	.099	[-.026, .224]	.096	[.018, .225]
PRIVC-LOY	.106	[-.029, .241]	.103	[.019, .232]
PERS-INM	.590	[.480, .699]	.616	[.510, .708]
PERS-LOY	.657	[.553, .760]	.681	[.581, .767]
INM-LOY	.753	[.686, .821]	.773	[.708, .829]

Source: own development.



4.2 Structural model and comparison of mediation specifications

Two structural specifications were examined to determine whether the relationship between personalization receptivity and loyalty intentions was fully mediated by anticipated immersive experience or whether a direct relationship between personalization and loyalty should also be considered.

The full-mediation model yielded CFI = 0.923, TLI = 0.909, RMSEA = 0.083, 90% CI [0.074, 0.092], and SRMR = 0.092. The partial-mediation model, which included an additional direct path from personalization receptivity to loyalty intentions, showed an improved fit: robust CFI = 0.932, robust TLI = 0.920, robust RMSEA = 0.078 (90% CI: [0.069, 0.087]), and SRMR = 0.071.

The scaled chi-square difference test indicated that the improvement in fit was statistically significant ($\Delta\chi^2 = 28.02$, $\Delta df = 1$, $p < 0.001$). In addition, AIC decreased from 20,447.92 to 20,402.72 and BIC from 20,707.88 to 20,666.51. Therefore, the partial-mediation model was used for the interpretation of the structural relationships.

As shown in Table 4, perceived usefulness had a significant positive relationship with personalization receptivity ($\beta = 0.484$, $p < 0.001$), supporting H1a. Trust in smart technologies was also positively and significantly related to personalization receptivity ($\beta = 0.426$, $p < 0.001$), supporting H1b.

Privacy and data concerns showed a small positive relationship with personalization receptivity ($\beta = 0.097$, $p = 0.033$). However, H1c proposed a negative relationship. Therefore, H1c was not supported.

Personalization receptivity had a significant positive relationship with anticipated immersive experience ($\beta = 0.671$, $p < 0.001$), supporting H2. Anticipated immersive experience was also positively related to loyalty intentions ($\beta = 0.468$, $p < 0.001$), supporting H3. In addition, the direct relationship between personalization receptivity and loyalty intentions was statistically significant ($\beta = 0.424$, $p < 0.001$). Thus, personalization was associated with loyalty both directly and indirectly through anticipated immersive experience.

Table 4 - Structural path estimates for the retained partial-mediation model

Hypothesis/test	Path	B	Robust SE	β	95% CI for B	p	Conclusion
H1a	PU -> PERS	.448	.065	.484	[.320, .576]	< .001	Supported
H1b	CONF -> PERS	.466	.080	.426	[.310, .622]	< .001	Supported
H1c	PRIVC -> PERS	.084	.039	.097	[.007, .161]	= .033	Not supported; opposite sign
H2	PERS -> INM	.731	.097	.671	[.542, .920]	< .001	Supported
H3	INM -> LOY	.454	.082	.468	[.293, .616]	< .001	Supported
Partial mediation test	PERS -> LOY	.448	.100	.424	[.252, .644]	< .001	Direct path retained

Source: own development.

The model explained 65.7% of the variance in personalization receptivity ($R^2 = 0.657$), 45.1% of the variance in anticipated immersive experience ($R^2 = 0.451$), and 66.5% of the variance in loyalty intentions ($R^2 = 0.665$).

The f^2 values were also calculated to assess the contribution of each predictor to the corresponding endogenous construct. Perceived usefulness showed an f^2 value of 0.303 and trust an f^2 value of 0.289, indicating medium effects on personalization receptivity. Privacy and data concerns showed a small effect ($f^2 = 0.027$). Personalization receptivity showed a large effect on anticipated immersive experience ($f^2 = 0.820$). For loyalty intentions, anticipated immersive experience showed an f^2 value of 0.110, while the direct contribution of personalization receptivity was $f^2 = 0.147$. Thus, both variables contributed to explaining loyalty intentions when estimated simultaneously.

Appendix Table A3 presents the global fit indices for the CFA and SEM models.

4.3 Indirect and total associations

Bootstrap analysis with 5,000 resamples was used to examine the indirect associations. As shown in Table 5, the indirect association between personalization receptivity and loyalty intentions through anticipated immersive experience was statistically significant ($B = 0.332$, 95% percentile bootstrap CI [0.218, 0.464]). Since the confidence interval did not include zero, the indirect association was supported.

At the same time, the direct association between personalization receptivity and loyalty intentions remained statistically significant ($B = 0.448$), while the total association was $B = 0.780$ (95% CI [0.615, 0.981]). Therefore, anticipated immersive experience partially mediated the relationship between personalization receptivity and loyalty intentions.

Perceived usefulness also showed significant indirect associations with loyalty intentions. The sequential indirect association through personalization and immersion was $B = 0.149$, 95% CI [0.091, 0.217], while the indirect association operating through personalization and its direct relationship with loyalty was $B = 0.201$, 95% CI [0.103, 0.330]. The total indirect association was $B = 0.349$, 95% CI [0.221, 0.491].

Similarly, the sequential indirect association of trust with loyalty intentions was $B = 0.155$, 95% CI [0.087, 0.236], and the indirect association through personalization was $B = 0.209$, 95% CI [0.117, 0.321]. The total indirect association for trust was $B = 0.364$ (95% CI: [0.240, 0.493]).



The indirect associations involving privacy and data concerns were considerably smaller. The sequential indirect association was $B = 0.028$, 95% CI [0.002, 0.059], while the indirect association through personalization was $B = 0.037$, 95% CI [0.003, 0.078]. The total indirect association was $B = 0.065$, 95% CI [0.005, 0.128]. These estimates should be interpreted cautiously because the underlying privacy-personalization relationship was small and, as reported below, sensitive to model specification.

Because the study is based on cross-sectional data, the indirect effects represent statistical indirect associations within the estimated model and should not be interpreted as evidence of a temporal causal process.

Table 5 - Indirect and total associations

Path	Effect	B	Bootstrap SE	Percentile 95% CI	CI excludes zero
PERS -> INM -> LOY	Indirect	.332	.062	[.218, .464]	Yes
PERS -> LOY	Total (direct + indirect)	.780	.093	[.615, .981]	Yes
PU -> PERS -> INM -> LOY	Sequential indirect	.149	.032	[.091, .217]	Yes
PU -> PERS -> LOY	Indirect via PERS direct path	.201	.059	[.103, .330]	Yes
PU -> LOY	Total indirect	.349	.068	[.221, .491]	Yes
CONF -> PERS -> INM -> LOY	Sequential indirect	.155	.038	[.087, .236]	Yes
CONF -> PERS -> LOY	Indirect via PERS direct path	.209	.052	[.117, .321]	Yes
CONF -> LOY	Total indirect	.364	.064	[.240, .493]	Yes
PRIVC -> PERS -> INM -> LOY	Sequential indirect	.028	.014	[.002, .059]	Narrowly
PRIVC -> PERS -> LOY	Indirect via PERS direct path	.037	.019	[.003, .078]	Narrowly
PRIVC -> LOY	Total indirect	.065	.031	[.005, .128]	Narrowly

Source: own development.

4.4 Robustness by prior smart-technology use

To examine whether the structural relationships differed according to previous smart-technology experience at festivals, the model was estimated separately for prior users ($n = 216$) and non-users ($n = 122$).

Before comparing the structural relationships, measurement invariance across the two groups was assessed. The metric invariance model did not show a significant deterioration in fit compared with the configural model ($\Delta\chi^2 = 14.48$, $\Delta df = 14$, $p = 0.415$). Therefore, equality of factor loadings across prior users and non-users was supported.

The structural paths were then constrained to equality across the two groups. The difference test was not statistically significant ($\Delta\chi^2 = 7.04$, $\Delta df = 6$, $p = 0.317$), indicating that the overall pattern of structural relationships did not differ significantly between prior users and non-users. The group-specific estimates are reported in Table 6.

Among prior users, perceived usefulness ($\beta = 0.499$, $p < 0.001$) and trust ($\beta = 0.342$, $p = 0.001$) were positively related to personalization receptivity. Personalization receptivity was positively related to anticipated immersive experience ($\beta = 0.605$, $p < 0.001$), while both anticipated immersive experience ($\beta = 0.404$, $p < 0.001$) and personalization receptivity ($\beta = 0.462$, $p < 0.001$) were positively associated with loyalty intentions. The relationship between privacy concerns and personalization was not statistically significant ($\beta = 0.095$, $p = 0.116$).

A similar pattern was observed among non-users. Perceived usefulness ($\beta = 0.471$, $p = 0.001$) and trust ($\beta = 0.532$, $p < 0.001$) were positively associated with personalization receptivity. Personalization was positively related to anticipated immersive experience ($\beta = 0.757$, $p < 0.001$), and both immersion ($\beta = 0.571$, $p < 0.001$) and personalization ($\beta = 0.346$, $p = 0.031$) were positively associated with loyalty intentions. Privacy concerns were again not significantly related to personalization receptivity ($\beta = 0.096$, $p = 0.197$).

Table 6 - Multigroup robustness analysis by prior smart-technology use

Path	Prior users β	95% CI for B	p	Non-users β	95% CI for B	p
PU -> PERS	.499	[.334, .714]	< .001	.471	[.185, .671]	= .001
CONF -> PERS	.342	[.161, .605]	= .001	.532	[.295, .795]	< .001
PRIVC -> PERS	.095	[-.021, .188]	= .116	.096	[-.040, .195]	= .197
PERS -> INM	.605	[.382, .758]	< .001	.757	[.563, 1.426]	< .001
INM -> LOY	.404	[.201, .649]	< .001	.571	[.259, .758]	< .001
PERS -> LOY	.462	[.229, .687]	< .001	.346	[.036, .774]	= .031

Source: own development.

The fit of the subgroup models was stronger for prior users (CFI = 0.920, TLI = 0.906, RMSEA = 0.083, SRMR = 0.078) than for non-users (CFI = 0.909, TLI = 0.892, RMSEA = 0.093, SRMR = 0.075). Therefore, the results for the smaller non-user group should be interpreted with additional caution.

4.5 Privacy sensitivity, controls, and alternative specifications

Additional analyses were conducted to examine the small positive coefficient observed between privacy concerns and personalization receptivity.



First, the variance inflation factors were 1.296 for perceived usefulness, 1.271 for trust, and 1.023 for privacy concerns. Since these values were low, the results do not indicate problematic multicollinearity among the three predictors.

The privacy coefficient nevertheless varied depending on the predictors included in the model. When privacy concerns were entered alone, the relationship with personalization receptivity was $\beta = 0.170$ ($p = 0.025$). When perceived usefulness was included together with privacy concerns, the privacy coefficient decreased to $\beta = 0.059$ and was not statistically significant ($p = 0.267$). When trust and privacy concerns were included together, the privacy coefficient was $\beta = 0.161$ ($p = 0.003$). Finally, when usefulness, trust, and privacy were entered simultaneously, the coefficient was $\beta = 0.097$ ($p = 0.033$).

Because one trust item explicitly addressed the protection of personal information, an additional analysis was conducted by excluding this item from the trust composite. Under this specification, the privacy coefficient decreased to $B = 0.064$ and was no longer statistically significant at the conventional 0.05 level ($p = 0.051$). Together with the non-significant privacy coefficients observed in the prior-user and non-user groups, these findings show that the positive privacy-personalization association was small and sensitive to model specification.

Prior smart-technology use and technology adaptation were also included as control variables. Prior technology use was not significantly associated with personalization receptivity ($\beta = -0.017$, $p = 0.710$), anticipated immersive experience ($\beta = 0.069$, $p = 0.179$), or loyalty intentions ($\beta = -0.038$, $p = 0.347$). Technology adaptation was not significantly related to personalization receptivity ($\beta = 0.063$, $p = 0.213$) or anticipated immersive experience ($\beta = -0.062$, $p = 0.339$), but showed a small positive relationship with loyalty intentions ($\beta = 0.141$, $p = 0.004$).

The main structural relationships remained statistically significant after the inclusion of the control variables. Personalization receptivity remained positively related to anticipated immersive experience ($\beta = 0.670$, $p < 0.001$), while anticipated immersive experience ($\beta = 0.502$, $p < 0.001$) and personalization receptivity ($\beta = 0.374$, $p < 0.001$) remained positively related to loyalty intentions.

An alternative structural specification was also estimated in which perceived usefulness, trust, and privacy concerns were allowed to relate directly to both anticipated immersive experience and loyalty intentions. This model showed CFI = 0.952, TLI = 0.941, RMSEA = 0.067, and SRMR = 0.055. In this specification, usefulness and trust showed significant direct associations with immersion and loyalty, whereas the personalization-to-immersion and personalization-to-loyalty coefficients were no longer statistically significant.

The results, therefore, indicate that the cross-sectional covariance structure can be represented by more than one plausible structural specification. Consequently, the partial-mediation model is interpreted as a theoretically specified representation of the observed associations rather than as evidence of a uniquely established causal sequence.

4.6 Common-method and model-diagnostic sensitivity

Since all focal variables were obtained from the same self-report questionnaire, additional analyses were conducted to evaluate potential common-method variance.

The single-factor model showed poor fit to the data: CFI = 0.600, TLI = 0.553, RMSEA = 0.185, and SRMR = 0.121. These results indicate that a single common factor cannot adequately represent the covariance among the items.

A latent method-factor sensitivity model was also estimated. This model produced CFI = 0.965, TLI = 0.957, RMSEA = 0.058, and SRMR = 0.082. Thus, although the six substantive constructs were clearly distinguishable from a single-factor structure, the possibility of some method-related covariance cannot be excluded.

Finally, modification indices and residual correlations were inspected to identify possible areas of localized model misfit. The largest modification indices involved the residual covariance between “*I would like festival apps/technologies to offer me personalized recommendations based on my musical, artistic, or cultural preferences*” and “*I appreciate when festival technologies adapt content to my individual interests (which artists to see, what activities to do, etc.)*” and possible cross-loadings involving “*Technologies that offer personalized experiences make a festival much more attractive to me*”. The largest absolute residual correlation was observed between “*Technologies that offer personalized experiences make a festival much more attractive to me*” and “*Using smart technologies at festivals (augmented reality, virtual reality, interactive installations) would make me feel completely immersed in the experience*”. ($r = 0.216$). No correlated residuals or cross-loadings were added to the model solely on the basis of these statistical diagnostics.

5. Discussion

5.1 Technology appraisals and personalization receptivity

The positive associations of perceived usefulness and trust with personalization receptivity are consistent with research showing that favorable evaluations of digital technologies are closely connected to users' willingness to engage with technology-enabled services. Jeong and Shin (2020) identified personalization as one of the technology attributes associated with memorable experience, satisfaction, and revisit intentions. More recently, Li et al. (2026) found that smart-tourism attributes, including personalization, contribute differently to experiential value, satisfaction, and revisit intentions, reinforcing the idea that users do



not respond to technology as a single undifferentiated stimulus. Trust is likewise an important enabling appraisal in data-dependent tourism services: research on smart tourism has shown that confidence in technology providers can reduce perceived vulnerability and support more favorable responses to technology-enabled services (Ngan et al., 2025).

The present study adds a different ordering to this literature. Rather than treating personalization as an established feature of a specific system, it examines whether attendees are receptive to personalized technological support in the first place. This distinction matters in festivals, where attendees face simultaneous choices about schedules, locations, activities, and content. Under such conditions, personalization may appear more attractive when technological touchpoints are expected to be useful and dependable. In other words, usefulness and trust may function as evaluative conditions under which attendees consider adaptation to their preferences worth accepting within the wider festival experiencescape.

At the same time, the literature does not support one universal ordering among these constructs. Yang et al. (2024), for example, modeled perceived personalization as an antecedent of technology trust in personalized tourism recommendation systems, whereas the present model places trust upstream of personalization receptivity. Together with the alternative structural specification tested in this study, these differences suggest that usefulness, trust, and personalization are closely connected evaluations whose ordering may depend on the technology, stage of use, and object of evaluation.

5.2 Personalization, anticipated immersion, and loyalty intentions

The association between personalization receptivity and anticipated immersive experience connects two research streams that have often been examined separately. Smart-tourism studies consistently show that personalization can increase the relevance and experiential value of digital services (Jeong & Shin, 2020; Li et al., 2026). From an experiencescape perspective, Han-Long and Wengel (2026) similarly show how digital mediation and personalized practices can become intertwined with immersive engagement in the wider visitor environment. The present findings are compatible with this view: attendees who are more receptive to technologies that adapt the festival to their interests may also find it easier to anticipate a more involving and personally meaningful experience.

This interpretation is also consistent with evidence from immersive-tourism research. Yu et al. (2024) found that features of virtual-reality destination content were associated with a stronger sense of presence, which in turn was connected to behavioral responses. Di Dalmazi et al. (2024) showed that immersive VR generated stronger presence and arousal than non-immersive content and that presence mediated intentions to visit and recommend the promoted destination. These studies concern actual exposure to a specific immersive technology, whereas the present study measures anticipated immersion across a broad category of smart festival technologies. The convergence is therefore conceptual: both lines of evidence indicate that stronger expected or experienced involvement in a technology-mediated environment is associated with more favorable conative responses.

The relationship between anticipated immersion and loyalty intentions is also consistent with event-specific evidence. Ngan and Lei (2025), comparing technology users and non-users, found that core dimensions of event experience were associated with revisit intention. Their study focused on an identifiable immersive technology used at a specific event, while the current study captures technology-contingent revisit and recommendation intentions at a more generalized level. This difference strengthens the need to interpret the present loyalty construct as an intention conditioned on technology-enabled festival provision, rather than as observed repeat behavior.

The partial-mediation pattern further indicates that anticipated immersion is unlikely to be the only experiential route linking personalization with loyalty intentions. Smart tourism research has associated personalization not only with experience quality but also with satisfaction and revisit-related outcomes (Jeong & Shin, 2020; Li et al., 2026). A technologically responsive festival may therefore be attractive because it is expected to be immersive, but also because relevance, convenience, and fit with personal preferences can create value independently of immersion. From an experiencescape perspective, this supports a view of technology-enabled experience as a set of overlapping routes rather than a single linear mechanism.

5.3 Privacy concerns: divergence from previous evidence

Privacy concerns produced the clearest divergence from the expected pattern. Substantial tourism research treats privacy as a potential cost of smart and personalized services. Femenia-Serra et al. (2022) showed that privacy concerns can constrain data disclosure in smart-tourism contexts. Lei et al. (2022) demonstrated competing effects in which personalization increased adoption-related responses while perceived privacy invasion worked in the opposite direction. At a broader level, Sustacha et al.'s (2023) found a negative relationship between privacy concerns and technology-enabled tourism experience. The small positive coefficient observed in the full sample therefore runs counter to the dominant direction of this evidence.

Recent research also shows, however, that the role of privacy is not uniform across outcomes and settings. Ngan et al. (2025) found that privacy concerns and protection intentions were relevant to satisfaction and destination loyalty, with trust in providers playing an important protective role. By contrast, Ngan et al. (2026) found that perceived usefulness contributed to favorable attitudes



and revisit-related outcomes, whereas privacy concerns did not significantly predict satisfaction or revisit intentions. These studies do not provide support for a positive privacy effect, but they show that weak or non-significant privacy relationships can emerge depending on what is measured and how the technology context is defined.

Several contextual differences may explain why the hypothesized negative association was not reproduced robustly here. Previous studies often anchor participants to a specific data practice, technology, or disclosure decision. In the present study, respondents could have had very different technologies in mind, ranging from digital tickets and navigation applications to AI, wearables, or immersive systems. Moreover, the outcome was receptivity to personalization rather than actual willingness to disclose data. An attendee may therefore express concern about data practices while still finding the idea of personalized festival support attractive in principle. This interpretation should remain cautious, because the privacy coefficient changed across model specifications and was not significant in either prior-use subgroup. The result is best treated as an unstable, sample-specific association that requires replication.

5.4 Prior use and interpretive boundaries

The absence of significant structural differences between prior users and non-users suggests that the associations in the model were not confined to attendees with direct previous experience of smart festival technologies. This finding differs from technology-specific event research. Ngan and Lei (2025), for example, compared attendees who used augmented reality with attendees who did not and found higher cognitive engagement among AR users, together with a stronger relationship between cognitive engagement and revisit intention. Their comparison involved one identifiable technology embedded in the same event context. The present study, by contrast, compares generalized prior exposure to a heterogeneous set of technologies across unspecified festivals. The lack of group differences may therefore reflect the broader and more prospective object of evaluation.

The alternative structural model places a further boundary on interpretation. When usefulness and trust were allowed to relate directly to immersion and loyalty intentions, the role assigned to personalization was reduced. This is consistent with the wider literature, where the same constructs have been organized in different sequences. Yang et al. (2024), for instance, position perceived personalization upstream of technology trust, while other smart-tourism studies treat personalization alongside other technology attributes that relate directly to experience and revisit outcomes (Jeong & Shin, 2020; Li et al., 2026). The cross-sectional covariance structure should therefore be understood as compatible with several theoretically plausible orderings rather than as evidence of a uniquely established temporal mechanism.

Finally, the strong associations among favorable technology evaluations, anticipated immersion, and loyalty intentions should be considered alongside the common-source design. All focal constructs were measured in the same questionnaire, and several items asked respondents to imagine favorable consequences of smart technologies. The latent method-factor analysis indicates that method-related covariance cannot be ruled out. Some of the observed relationships may therefore reflect both substantive expectations and a broader positive orientation toward technology-enabled festivals.

5.6 Theoretical Implications

This study contributes by integrating technology-related evaluations with the experiencescape perspective in the context of smart festival technologies. Rather than proposing a new theory, it shows how perceived usefulness, trust, personalization receptivity, anticipated immersion, and loyalty intentions can be interpreted within a broader technology-enabled festival environment. The experiencescape perspective is useful because it situates technological touchpoints within the broader experiential setting rather than treating them as isolated service tools.

The partial-mediation results are also theoretically relevant. Personalization receptivity was associated with loyalty intentions both directly and indirectly via anticipated immersive experience, suggesting that technology-enabled experiential value may operate through multiple routes. At the same time, the alternative structural model showed that other plausible orderings are compatible with the data. The proposed model should therefore be interpreted as a theoretically grounded representation of the observed associations rather than as a unique causal sequence.

The privacy finding should be treated cautiously. The small positive association between privacy concerns and personalization receptivity ran counter to the hypothesized direction and was sensitive to model specification. It therefore represents an unexpected association that requires replication rather than evidence that privacy concerns enhance personalization.

5.7 Practical Implications

The findings provide propositions that festival managers can test when designing technology-enabled experiences, but they should not be interpreted as demonstrated effects on loyalty. Functional technologies, personalized systems, and immersive technologies may create value in different ways and should therefore not be managed as a single category.



Functional tools such as digital tickets, QR codes, RFID, and navigation systems may be evaluated primarily in terms of convenience and reliability. Personalized systems may be more relevant when they help attendees identify content aligned with their preferences, while immersive technologies may require a stronger focus on engagement and presence.

Privacy safeguards remain important regardless of the positive coefficient observed in the full sample. Transparency, meaningful choice, data minimization, and user control should remain central when personal information is used. These recommendations are most applicable to festival contexts similar to the present sample.

6. Conclusions

The findings show that favorable evaluations of smart festival technologies are associated with anticipated experiential and loyalty-related responses. The main contribution lies in integrating technology-related appraisals with an experiencescape perspective and demonstrating that receptivity to personalization and anticipated immersion are part of a broader technology-enabled festival environment.

For managers, the main implication is that technologies should be evaluated according to the type of value they are expected to support rather than treated as interchangeable solutions. The findings concern stated expectations and intentions and should not be interpreted as evidence of actual loyalty behavior.

The cross-sectional, single-source design precludes causal or temporal interpretation and does not rule out common-method covariance. Several measures were prospective, respondents were not anchored to one specific festival or technology, and the technology category was heterogeneous. The study also relied on stated intentions rather than observed behavior, used a two-year attendance window, and included respondents without prior use of smart technology.

The sample was predominantly young, Spanish, and music-festival-oriented students, and recruitment through online communities may have introduced self-selection bias. Future research should use event-specific field studies, actual technology users, behavioral data, longitudinal designs, and experiments. Comparative studies should distinguish functional, personalized, and immersive technologies and examine technology readiness and privacy calculus variables as potential moderators.

Acknowledgements

This study was supported by grant RYC2023-043553-I, funded by MICIU/AEI/10.13039/501100011033 and ESF+

Declaration on the Use of Artificial Intelligence

Artificial intelligence (ChatGPT, OpenAI) was used for language editing and readability improvement. The authors reviewed all outputs and take full responsibility for the final manuscript.

CRediT authorship contribution statement

María Fernández-Bo: Conceptualization, Methodology, Validation, Investigation, Formal analysis, Writing – review and editing.

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Declaration of competing interest: None.

Data Availability Statement: The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable ethical and data-protection requirements.

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Appendix Table A1. Measurement items

Construct	Items	Source
Perceived Usefulness (PU)	4 items	Adapted from: Davis (1989) Bär et al. (2025)
Personalization Receptivity (PERS)	4 items	Adapted from: Koo et al. (2025) Jeong & Shin (2020)
Anticipated Immersive Experience (INM)	3 items	Adapted from: Chen et al. (2025)
Trust (CONF)	3 items	Adapted from: Gefen et al. (2003)
Privacy Concerns (PRIVC)	3 items	Adapted from: Malhotra et al. (2004)
Technology-Contingent Loyalty Intentions (LOY)	3 items	Adapted from: Lee et al. (2012) Jeong & Shin (2020)

Source: own development.



Appendix Table A2. Descriptive statistics and standardized loadings

Statements	Mean	SD	Loading	SE	p
Perceived Usefulness					
Smart technologies at festivals would help me enjoy the experience more.	4.843	1.522	0.850***	0.024	< .001
Smart technologies would improve my ability to navigate and plan my festival experience (finding artists, schedules, locations).	5.728	1.269	0.661***	0.039	< .001
Smart technologies would make my festival experience more enriching, educational, and memorable.	4.757	1.514	0.848***	0.027	< .001
Overall, I consider smart technologies to be useful for attending festivals.	5.249	1.503	0.783***	0.035	< .001
Trust in Smart Technologies					
I trust that smart festival technologies will work correctly when I need them.	5.186	1.426	0.767***	0.036	< .001
I trust that smart festival technologies will protect my personal information adequately and securely.	4.680	1.770	0.833***	0.029	< .001
I believe that festival organizers use smart technologies primarily with my best interest in mind (improving my experience).	5.065	1.559	0.813***	0.028	< .001
Privacy and Data Concerns					
I am concerned that smart technologies collect too much personal information about me.	5.426	1.555	0.896***	0.022	< .001
I am worried about how festival organizers might use or share my personal data if I use their smart technologies (apps, wearables, etc.).	5.296	1.603	0.905***	0.018	< .001
I am concerned about my privacy when using smart technologies at festivals.	5.213	1.687	0.913***	0.019	< .001
Personalization Receptivity					
I would like festival apps/technologies to offer me personalized recommendations based on my musical, artistic, or cultural preferences.	5.462	1.521	0.834***	0.033	< .001
I appreciate when festival technologies adapt content to my individual interests (which artists to see, what activities to do, etc.).	5.592	1.410	0.862***	0.026	< .001
I value that festival technologies allow me to personalize my experience (create my own schedule, mark favorite artists, receive personalized notifications).	5.657	1.370	0.823***	0.030	< .001
Technologies that offer personalized experiences make a festival much more attractive to me.	5.186	1.463	0.742***	0.039	< .001
Anticipated Immersive Experience					
Using smart technologies at festivals (augmented reality, virtual reality, interactive installations) would make me feel completely immersed in the experience.	4.657	1.541	0.848***	0.024	< .001
Smart technologies at festivals would help me emotionally connect with the music, art, or culture of the event.	4.450	1.693	0.887***	0.019	< .001
I feel more involved and present at a festival when there are immersive technologies (augmented reality, virtual reality, interactive screens).	4.290	1.703	0.848***	0.024	< .001
Technology-Contingent Loyalty Intentions					
I would attend again a festival that offers innovative smart technology experiences (AI apps, augmented/virtual reality, personalization).	5.033	1.472	0.862***	0.023	< .001
I would recommend to my friends and acquaintances a festival that integrates smart technologies well into the experience.	5.112	1.461	0.921***	0.016	< .001
If a festival offers smart technologies that enhance the attendee experience, I have much more intention to attend again.	4.938	1.579	0.818***	0.025	< .001

Source: own development.

Appendix Table A3. Global fit indices and structural models

Model	Scaled chi2 / df	chi2/df	Robust CFI	Robust TLI	Robust RMSEA [90% CI]	SRMR	AIC	BIC
Six-factor CFA	343.93 / 155	2.22	.952	.941	.067 [.058, .077]	.055	20310.84	20597.57
Original full mediation	463.38 / 162	2.86	.923	.909	.083 [.074, .092]	.092	20447.92	20707.88
Retained partial mediation	426.69 / 161	2.65	.932	.920	.078 [.069, .087]	.071	20402.72	20666.51
Broad direct-path sensitivity	343.93 / 155	2.22	.952	.941	.067 [.058, .077]	.055	20310.84	20597.57
Prior users partial model	363.63 / 161	2.26	.920	.906	.083 [.072, .095]	.078	12933.72	13166.61
Non-users partial model	312.37 / 161	1.94	.909	.892	.093 [.078, .108]	.075	7479.57	7673.05
Control sensitivity model	532.08 / 195	2.73	.918	.903	.079 [.071, .087]	.095	20395.95	20682.68

Source: own development.