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PROCEEDINGS ENTER26 Working Papers

ENTER 2026 International eTourism Conference, Breda, Netherlands, January 2026

ENTER26 Working Paper Proceedings

Version 1.0

Published by:
The International Federation for IT and
Travel & Tourism

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Preface

This volume contains the working papers accepted for presentation at ENTER26, the annual eTourism Conference of the International Federation for Information Technology and Travel & Tourism (IFITT), held in January 2026 in Breda, The Netherlands. The ENTER Working Papers proceedings complement the full paper volume by providing a dedicated space for emerging ideas, exploratory studies, conceptual developments, and early empirical work at the forefront of eTourism research.

The working papers included in this volume reflect the diversity and experimental character of contemporary eTourism scholarship. A substantial number of contributions engage with artificial intelligence and automation, examining topics such as generative AI in travel planning and content creation, trust and perceived authenticity of AI-generated information, human–AI collaboration, algorithmic recommendation, and the ethical and governance implications of AI adoption in tourism and cultural heritage contexts. Several papers advance conceptual discussions or critical reflections, while others report early-stage empirical findings, prototype designs, or methodological innovations based on experiments, surveys, netnography, and large-scale user-generated data.

A second prominent theme addresses human–technology interaction, experience, and embodiment. Papers in this area investigate how digital technologies shape tourist perception, agency, inclusion, and meaning-making across physical, virtual, and hybrid environments. Contributions explore virtual and multisensory tourism experiences, metaverse hospitality, gaming and digitally mediated practices, embodied interactions in transit and destination spaces, and the role of immersive and assistive technologies in enhancing accessibility and inclusion. Together, these studies illustrate how tourism experiences are increasingly co-constructed through interaction with digital artefacts, interfaces, and platformed environments.

The proceedings further include a strong set of contributions on digital communication, destination image, and platform-mediated visibility. These papers examine influencer marketing, short-form video narratives, online reviews, AI-mediated discovery and ranking processes, and platform-specific communication strategies. They highlight how digital channels and algorithmic infrastructures shape destination image formation, engagement, and decision-making across different tourist segments and cultural contexts.

Issues of sustainability, responsibility, and governance also feature prominently. Working papers address smart sustainability measurement, digital nudging for sustainable behaviour, overtourism detection using user-generated content, residents' inclusion in AI-enabled destinations, and the role of technology in supporting inclusive and regenerative tourism development. In addition, several contributions focus on digital ecosystems and organisational contexts, examining ICT adoption and lifecycle dynamics in tourism SMEs, blockchain-based solutions, digital distribution strategies, and policy-relevant topics such as digital nomad mobility and visa effectiveness.

All working papers included in this volume were selected through a double-blind peer-review process. Together, they represent research in progress, ideas that are being tested, refined, and debated, and underscore the role of ENTER as a platform not only

for consolidated knowledge, but also for intellectual experimentation, dialogue, and community building.

We hope that this volume will stimulate discussion, inspire future research, and encourage collaboration across disciplines, methods, and career stages within the global eTourism research community.

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Professor Peter O'Connor
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From Trip Planning to Experience Curation: Designing A Campus AI Travel Assistant Prototype

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Abstract. This study presents the design of a Retrieval-Augmented Generation (RAG)-based AI-assisted conversational prototype for a university campus, conceptualized as a destination micro-environment. The research aims to explore how the conversational AI tool can enhance the experiences of first-time visitors, including freshmen, across three interconnected phases: pre-trip planning, on-site navigation, and post-trip experience curation. The proposed prototype incorporates elements of memorable tourism experiences and a RAG framework that integrates local and cloud-hosted models, leveraging multimodal campus data sources. It illustrates how context-aware recommendations, dynamic itinerary generation, and real-time information updates can enhance engagement and personalization. The findings aim to offer a scalable framework for integrating RAG-based conversational AI tools into tourism experience design, providing insights for smart tourism development and micro-destination innovation.

Keywords: RAG, conversational AI tool, Experience Design, Destination.

1 Introduction

The rapid diffusion of LLM and Generative AI is transforming how travelers discover, plan, and experience destinations [1]. Destinations offer an ideal proving ground for a conversational AI tool for travel, where digital innovation can be implemented, evaluated, and refined within bounded spatial, social, and technological ecosystems [2]. With the emergence of low-code or no-code platforms for agentic AI, conversational AI tools can serve as travel assistants to deliver personalized, context-aware guidance throughout the entire travel lifecycle—before, during, and after a visit [3][4]. By leveraging Retrieval-Augmented Generation (RAG), such assistants synthesize real-time contextual data (e.g., events, routes, and weather) with curated knowledge bases (e.g., cultural narratives, service directories), producing adaptive and evolving recommendations that align with users' intentions. Furthermore, AI assistants can act as experience mediators through conversational and multimodal interfaces, enhancing meaning-making and emotional engagement [4].

Developing a RAG-based AI-assisted conversational prototype as the Campus AI Travel Assistant for the National Dong Hwa University (NDHU) campus addresses

several research and practical objectives. First, it investigates how conversational AI tools can personalize the visitor journey by integrating context-aware data. Second, it explores the potential for AI-assisted co-creation, enabling users to personalize itineraries, reflect on their experiences, and engage meaningfully with the local context. Third, it examines how destinations can leverage AI to co-create travel experiences, striking a balance between innovation and responsible tourism.

2 Literature Review

2.1 Campus as Destination Micro-environments

University campuses have long attracted visitors as sites of learning, culture, and architectural significance. Visiting campus allows visitors to explore learning environments while experiencing the university's social and architectural fabric [5]. Therefore, universities are evolving into hybrid educational and tourism destinations. The concept of campus-based tourism situates university environments as destination micro-environments for the cultural and learning attractions.

Prior research identifies three major dimensions of campus-based tourism [6]. First, tourism characteristics and visitor profiles encompass educationally motivated tourists, local community visitors, and culturally curious travelers. Second, the relationship between tourism and the academic environment underscores the importance of balancing touristic engagement with institutional integrity and learning objectives. Third, social, educational, and economic benefits emphasize how universities contribute to regional development, cultural exchange, and sustainable community engagement.

The concept of a destination micro-environment extends this perspective by emphasizing the intersection between place-based learning and localized tourism ecosystems. A micro-environment refers to a small-scale, self-contained destination like a university campus, where clearly defined spatial and social boundaries create opportunities for controlled experimentation with technology, visitor interaction, and experience design.

These environments serve as living laboratories for testing smart tourism applications and sustainable design practices. Although located in rural Hualien, the NDHU campus, with its 251-hectare landscape, provides an ideal testbed for RAG-based AI-assisted conversational prototype as travel assistants due to its defined geography, diverse stakeholder community, and manageable visitor volume. It bridges the logic of destination management organizations (DMOs) with the experiential campus context, making it possible to explore how conversational AI tools can facilitate personalized itineraries, tour guiding, and memory curation.

2.2 Experience Design and Co-Creation

Destinations embody the experience economy, where emotional engagement defines value. McManus et al. (2021) position campuses as experiencescapes where co-creation between students and visitors enhances authenticity and fosters participatory meaning-making [7]. The NDHU campus exemplifies this duality: a space of learning and leisure where local and international students engage in cultural expression, creating narratives

that blend academic and touristic value. Campus visitors value serenity, curiosity, and cultural diversity—dimensions central to memorable tourism experiences [8].

Integrating AI into the tourism journey aligns with the expectation–consequentiality–recollection–affect model of memorable experiences, emphasizing how anticipation and reflection jointly shape satisfaction and attachment. In the context of campus destinations, a conversational AI tool serves as the travel assistant, supporting visitors across the trip lifecycle: Pre-trip (Expectation): Personalized recommendations and narrative-driven storytelling; During-trip (Consequentiality): Context-sensitive prompts, navigation, and sensory enhancement; Post-trip (Recollection and Affect): Memory curation, digital journaling, and emotional reflection. The research objective is to identify whether routine site visits can be transformed into personalized learning narratives, supporting sustainable, emotionally resonant, and educative tourism experiences.

2.3 From GenAI and LLMs to Tourism Experience Design

In this emerging paradigm, conversational AI tools become both the medium and the collaborator in shaping visitor journeys [2]. The authors aim to develop an RAG-based AI-assisted conversational prototype that allows destinations to convert fragmented local data into adaptive and personalized experiences. RAG systems merge local data with LLM reasoning, enabling conversational itinerary building and cultural storytelling. With proper design, the assistant's functions align with the key elements of a memorable tourism experience, extending emotional resonance beyond the trip completion.

Additionally, by considering the ethics and elements of responsible tourism [9], the NDHU Campus Travel AI Assistant prototype incorporates economic, social, and environmental responsibility, and considers how destinations can deploy AI in an ethical and sustainable manner. Risks of hallucinations in itinerary generation will be improved through the introduction of RAG and the inclusion of cultural diversity and environmentally friendly guidelines to avoid misrepresentation. This approach connects emotional experience design with sustainable management, advancing the notion of campuses as living laboratories for AI tourism innovation.

This conversational AI tool thus acts as the medium tool, supporting sustainability and personalization through human–AI collaboration. Such a design view transforms tourism from a transactional activity into an evolving narrative supported by human–AI collaboration.

3 Methodology

3.1 Research Design

Following the logic of design thinking, the project combines system prototyping with contextual investigation to iteratively develop and evaluate a Campus Travel AI Assistant that assists visitors before, during, and after their campus journey. This study aims to investigate the impact of conversational AI tools on travel experiences within a con-

ceptual framework. It adopts a design science and qualitative inquiry approach to explore how generative AI can support tourism experience design in destination micro-environments, using NDHU as a pilot site.

In-depth interviews will be conducted after user interaction with the prototype, serving as a post-use evaluation. Informant profiles include 1) students (domestic and international) and their family and friends who act as both users and co-designers of the AI assistant; 2) faculty and administrative staff; and 3) local vendors and community stakeholders involved in the broader network within the campus. Data will be collected through semi-structured interviews, prototype usability testing sessions, and observational field notes. The combination of user-centered design and academic evaluation enables triangulation between system behavior, user needs, and place identity.

3.2 Architecture Overview for A Campus AI Assistant Prototype

The Campus Travel AI Assistant was developed following a modular architecture that integrates retrieval, generation, and interaction components via n8n, an open-source workflow automation platform that connects APIs with services (see Figures 1 and 2).

Retrieval Layer (Knowledge Base). The retrieval layer consolidates NDHU's heterogeneous and fragmented campus information into a semantically integrated knowledge base that can be efficiently queried by the AI engine. The data are categorized into macro-context datasets, i.e., history and cultural narratives, and micro-context datasets. Spatial (zones/buildings/POIs) and temporal (events/schedules) granularity are normalized during retrieval. Sources include floor plans of each building, restaurant menus, landmarks, event calendars, transportation schedules, and so on. The collection follows a multi-stage data semantics workflow: (1) extraction via web scraping, APIs, and manual curation; (2) data cleaning to remove redundant and noisy entries; (3) normalization into a unified schema (e.g., lowercase fields, standardized temporal formats, bilingual labels); (4) semantic linking to align conceptually related entities across datasets (e.g., the same restaurant or service appearing in different sources); and (5) vector indexing to prepare all content for dense retrieval within the RAG pipeline, which enables a more accurate and personalized itinerary than default LLM outputs.

Generation Layer (AI Engine). A RAG pipeline enables the assistant to generate context-aware responses by combining vector-based document retrieval with real-time user queries. The proposed configuration includes: 1) Cloud Hosting: via Google Gemini API for advanced multimodal reasoning and translation tasks; 2) Local Hosting: via Ollama using open models for privacy-sensitive or offline tasks. Text embeddings encode campus documents into dense vectors, enabling the search for semantic similarity.

Interaction Layer (User Interface). Built with Flutter for cross-platform deployment, the interface supports access on mobile, web, and desktop devices. Core functions include trip planning and itinerary saving, live navigation and map visualization (Google

Maps APIs), event and promotion notifications, and post-visit memory and survey collection. These interactions allow users to refine their personalized guidance.

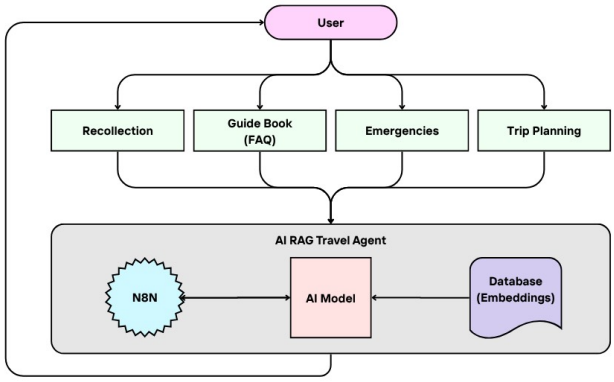

Fig. 1. Proposed Campus AI Travel Assistant System Architecture. (Author's own work)

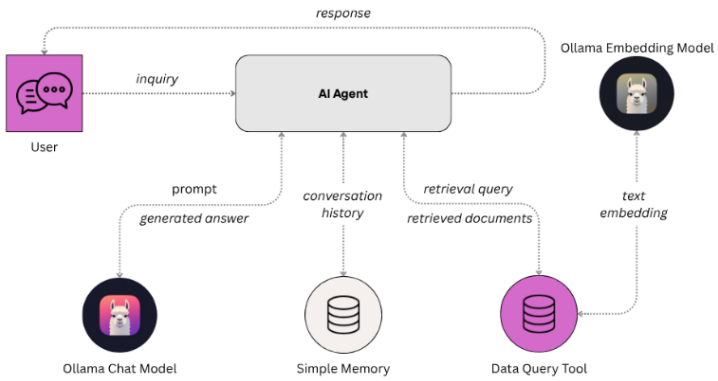

Fig. 2. Proposed RAG-based Conversational AI Prototype Architecture. (Author's own work)

4 Anticipated Outcome and Future Directions

The Campus Travel AI Assistant is expected to demonstrate the feasibility of integrating RAG-based AI-assisted conversational prototype within a destination micro-envi-

ronment. The working paper will likely contribute to: (1) Extension of destination tourism research into AI-assisted digital experience design, which adds a technological mediation perspective. (2) Integration of the memorable experience elements with AI design. (3) Development of a smart micro-destination framework for scaling AI-assisted tourism management to community-based destinations and other localized travel environments. Future research could also focus on resolving semantic divergence by developing destination-specific XML schemas. Three directions are proposed for further development. First, future iterations will explore multimodal generative models that incorporate visual recognition, voice interaction, and narrative synthesis to create more immersive and inclusive travel experiences. Second, adopting domain ontologies that share conceptual relationships across destinations and community collaborations could validate the scalability, assessing how conversational AI tools adapt to different cultural, spatial, and data ecosystems. Third, the dimensions of responsible tourism must be systematically addressed through transparent data practices, participatory co-design, and continuous evaluation of AI's social and cultural implications.

Funding

This research was supported by the Academic Research Grant for New Faculty (114T2531-1) from the National Dong Hwa University, Hualien, Taiwan.

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Human or AI? Navigating contradicting travel recommendations

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Abstract. This working paper explores how consumers respond when AI and human advice contradict each other, focusing on a tourism setting. While previous research has looked at AI vs. human advisor choice, little is known about how consumers deal with contradictory advice from these advisors. Building on algorithm aversion, reactance theory, and the anchoring effect, we propose that individuals are more likely to accept a human recommendation contradicting an AI recommendation. We also propose that this effect will be mediated by perceived accountability, predicting that humans are seen as more accountable. Moreover, we expect that this effect is moderated by the order of recommendation sequence, with a more pronounced human first effect. The research is based on three experimental studies designed to test three hypotheses. Although data collection is ongoing, we anticipate our findings to contribute to scholarship on human-AI collaboration and provide actionable guidance to industries that rely on hybrid recommendation systems, such as hospitality and travel.

Keywords: AI recommendation, Human recommendation, Travel, Contradiction, Perceived accountability.

1 Introduction

The rise of AI-driven recommendation systems has reshaped consumer decision-making in various domains, including travel (e.g., Shi et al., 2021; Shin et al., 2025). While prior studies have examined consumer preferences for AI versus human recommendations (Flavian et al., 2023; Jin & Zhang, 2025; Xu et al., 2024), little is known about how consumers react when AI and human recommendations directly contradict each other. For example, consider a traveler setting up a trip to Spain in June a recommendation made by a human agent might highlight the favorable weather conditions and cultural heritage of Spain, such as music, and declare it an ideal period for a culturally infused beach vacation. Conversely, an AI agent might identify June as a crowded time for travel because of popular festivals and variable weather conditions, predicting discomfort throughout the trip.

This research addresses a key question: Are consumers more likely to follow an AI recommendation or recommend it when it contradicts a human, or a human recommendation when it contradicts AI? Building on algorithm aversion (Dietvorst et al., 2015), reactance theory (Brehm, 1966), anchoring effect theory (Tversky and Kahneman, 1974) we propose that consumers are more likely to trust a human contradicting AI rather than AI contradicting a human. Furthermore, we explore why and when this effect occurs by investigating the mediating role of perceived accountability and the moderating effect of recommendation order (primacy vs. recency effects).

2 Conceptual framework and hypotheses development

2.1 Main effect -AI vs. Human recommendation

While AI recommendations are often perceived as objective and data-driven (Glikson & Woolley, 2020), research also suggests that humans remain skeptical of AI's ability to account for complex, nuanced, and experiential factors in decision-making (Glikson and Woolley, 2020; Dietvorst et al., 2015). According to Reactance Theory (Brehm, 1966), individuals may resist recommendations they perceive as overly controlling or imposed, which can occur when AI offers definitive suggestions that conflict with human intuition. This aligns with work suggesting that consumers evaluate AI as effective for analytical tasks but inferior for decisions requiring subjective judgment (Castelo et al., 2019), such as travel and hospitality choices. Moreover, research in Human-AI Collaboration (Jarrahi, 2018) suggests that people often defer to AI for quantitative, logic-based decisions but remain more reliant on human intuition for personal or context-rich choices. When a human contradicts an AI recommendation, consumers may perceive the human as integrating additional qualitative insights that AI lacks, leading to greater trust in the human's advice (Longoni et al., 2019). Conversely, when AI contradicts a human recommendation, consumers may view this opposition as rigid, inflexible, or lacking nuance, making them more likely to dismiss it. Thus, we propose that a human recommendation opposing an AI recommendation is more likely to be followed than an AI recommendation contradicting a human recommendation due to perceived human intuition, experiential knowledge, and reactance against algorithmic rigidity.

H1. Consumers are more likely to follow a recommendation when a human contradicts an AI recommendation than when an AI contradicts a human recommendation.

2.2 Mediation by perceived accountability

Perceived accountability in a recommendation context refers to the extent to which the recommender is seen as being personally responsible for the consequences of the recommendation provided (Aggarwar & Mazumdar, 2008; Lerner & Tetlock, 1999; Shi and Park, 2019). Accountability is a cornerstone of trust in interactions with humans and AI (e.g. Choung et al., 2023; Esmaeilzadeh & Vaezi; 2021). In recommendation contexts, particularly in travel and tourism, where decisions carry personal and financial implications, consumers place more weight on recommendations when they believe

the source can be held responsible for the outcome (e.g., Kim et al., 2025). When a human contradicts AI, consumers may view this as an act of taking ownership or standing by one's judgment, enhancing the perception of accountability. In contrast, AI systems, while efficient, are often seen as opaque and lacking personal responsibility (Law et al., 2025; Castelo et al., 2019). This can trigger algorithm aversion when rec- ommendations are perceived as untraceable or unaccountable (Dietvorst et al., 2015).

Since humans can be questioned, blamed, or praised, consumers may see human recommendations as risk-adjusted and more thoughtful, especially when they override AI advice (Longoni et al., 2019).

H2. The effect of conflicting recommendations (AI vs. human) on consumer choice is mediated by perceived accountability.

2.3 Moderating effect: Recommendation order

Order effects are well-documented in decision-making psychology (Hogarth & Einhorn, 1992). Drawing on anchoring effect theory (Tversky & Kahneman, 1974), we propose that the order of the recommendations (humans and AI) plays a role in determining the persuasive value of the recommendation. An anchoring effect exists when consumers rely mainly on the initial piece of information (anchor) to make a decision (Seo & Cho, 2021; Tversky and Kahneman, 1974). As such, the recommendation by the first advisor may serve as an initial anchor that is seen as more impactful for the final decision than the recommendation by the second agent. Furthermore, a con- sumer's trust in an advisor serves as a proxy that the recommendation is valuable (Adomavicius et al., 2013). Indeed, Adomavicius et al. (2013) show that if a recommender system (i.e., advisor) is perceived as more trustworthy, the effect of the initial anchor becomes even stronger. Meanwhile, research suggests that consumers tend to perceive human advisors as more trustworthy than AI advisors (e.g. Castelo et al., 2019; Longoni et al., 2019). Hence, if a human recommendation comes first, it will serve as the initial anchor. Coupled with the fact that trust may further enhance the positive effect of the first anchor, this should lead to a more positive perception of a recommendation based on the human AI order. Conversely, consumers tend to trust AI less compared to humans. Hence, if the AI offers the initial recommendation, followed by the human, the effect should still be positive, but likely be weaker compared to the human first scenario.

H3. The order in which recommendations are presented (AI first vs. human first) moderates the main effect. Specifically, the human first effect should be stronger compared to the AI first effect.

2.4 Control variables

Previous research argued that individual factors, in particular AI literacy and previous experiences with AI-systems, shape how consumers can rely on AI recommendations (Tully et al., 2025). First, individuals that show high AI literacy toward algorithmic systems, are more likely to recognize "the black box" nature of these systems (Chung,

2025), consequently, are more likely to express strong concerns and tend to be more skeptical (Archambault et al., 2024). In the same vein, prior experience with AI-systems can change how consumer trust evolves over time. As consumers acquire experience with AI systems, they perceive opaque decision processes and bias, which in turn diminishes their trust in the system (Horowitz et al., 2023).

3 Methodology

Three studies aim to test our proposed theoretical model. In study 1, we test the main effect that consumers are more likely to follow a recommendation when a human contradicts an AI recommendation than when an AI contradicts a human recommendation (H1). Since the recommendations are different in term of valence, and in order to avoid any potential confounds with recommendation sources, we set a valence-source counterbalancing method. Basically, each source (AI vs. Human) gives both positive and negative recommendations.

In addition, we add 2 baseline control conditions where the contradiction happens within the same source type: Human Vs. Human and AI vs. AI. These additional controls clarify whether the effects are driven by contradiction source rather than by any type of persuasiveness of a particular source type. In a between subject design, only the source of the recommendation will vary, maintaining the content constant and only the source type varies across conditions. In particular, we change 1) whether the contradiction is cross-source type or same source, and 2) which source gives the positive vs. negative recommendation.

For example, in a scenario where a traveler plans to visit Spain in June:

- Human recommendation: “Spain in June is ideal. Great weather and local festi- vals like San Juan. It's a perfect time for culture and beach.”
- AI recommendation: “Spain in June is not ideal. The weather can be unpredicta- ble, and festivals like San Juan can make it crowded. It might not be the best time for culture and beach experiences”

Study 2 examines if the main effect is mediated through perceived accountability (H2), using two condition experiment incorporating a validated accountability scale (e.g., Lerner & Tetlock, 1999; Aggarwal & Mazumdar, 2008). Study 3 tests the hypothesis that the order in which recommendations are presented (AI first vs. human first) mod- erates the main effect. Specifically, the human first effect should be stronger compared to the AI first effect (H3).

Throughout all the 3 studies, we control for AI literacy and prior experience with AI recommendations systems. We will measure AI literacy through the validated scale of Tully et al. (2025). While previous experience with AI systems will be evaluated via items reflected in the survey (e.g., frequency of usage).

4 Expected contributions

Grounded on Reactance Theory (Brehm, 1966), we expect to contribute to discourses on AI aversion (e.g., Castelo et al., 2019; Dietvorst et al., 2015; Reich et al., 2023). In particular, our study aims to integrate literature on the above-mentioned theories and apply it to the emerging use of AI in the tourism context. In doing so, we aim to extend knowledge on the reactance theory by offering insights on how consumers may respond to AI versus human based recommendations that oppose each other. Moreover, we aim to offer a more detailed understanding of the specific mechanism (i.e., perceived accountability) that may explain why consumers are more likely to follow a recommendation when a human contradicts an AI recommendation compared to when an AI contradicts a human recommendation. Lastly, drawing on the anchoring effect (Tversky & Kahneman, 1974) our investigation will offer a more nuanced understanding of how recommendation order (human vs AI) may moderate this effect.

Furthermore, our insights will also have implications for practitioners. For instance, companies in the tourism sector will gain insights about how to combine AI and human agents during travel recommendations in the most efficient manner to increase consumers acceptance. For example, companies can use collaborative recommendation models to provide customers with the best of both worlds, namely the analytical capabilities of the AI and the subjective context rich contributions offered by humans. Specifically, the results of this study will offer insights on the order of recommendations that leads to the highest likelihood that a recommendation by human and AI agent is accepted.

5 Limitations and future research directions

While the content of the recommendation messages will be kept constant to control for content, the way participants interpret tone, authority, or intention could lead to unintended bias based on who made the recommendation. Future research should examine how individual and cultural differences shape these interpretations, comparing responses across contexts and populations. Moreover, the constructs that this study looks at, such as trust, accountability, and reactance, are subjective constructs that are likely to differ across individuals, cultural backgrounds, or experiences with AI systems which would threaten the external validity and replicability of the findings. Future studies should adopt cross-cultural and longitudinal designs, complemented by mixed methods, to enhance validity and replicability. Finally, the study assumes that an unchanging perception of AI is that is not personal, thereby underestimating the fact that an increase in consumer familiarity with AI systems, along with an ever-evolving landscape of more transparency and personalized support AI systems, may shift trust for decision making in an unforesighted manner in the future. Further works should therefore explore how evolving AI capabilities, from adaptive transparency to empathetic design, influence user autonomy and ethical judgments.

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Consumer Willingness to Pay for Robot-Delivered Services in Tourism and Hospitality: A Critical Reflection Review

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Abstract: The growth of service robots usage in the tourism and hospitality (T&H) sector has stimulated scholars´ interest in studying consumer willingness to pay (WTP) for robot-delivered services. Despite their significance, findings from previous studies remain fragmented and contradictory regarding both the magnitude of WTP and its underlying drivers. This critical reflection review systematically retrieves and analyses 32 articles. For this purpose, it employs an authenticity-efficiency framework to interpret divergent results. As main findings, the framework shows how perceived gains or losses in these dimensions shape WTP. As a contribution, this study offers a novel lens for interpreting WTP in T&H, providing therefore actionable insights for both scholars and practitioners.

Keywords: Service Robot, Willingness to Pay, Authenticity-Efficiency Framework, Tourism and Hospitality.

1 Introduction and background of the study

The adoption of service robots is growing in the tourism and hospitality (T&H) industry [1]. Even with this trend, some obstacles slow the adoption of the technology on a full-scale, worldwide level [2]. Among these obstacles is managers´ scepticism about the financial return from their investments in the technology [3]. For this reason, a significant number of studies were done to understand consumer willingness to pay (WTP) for robot-delivered services in the industry. Despite their significance, these articles are not conclusive because of some contrasting findings. Given the relevance of the topic, it would be beneficial to have a systematic overview of the topic and insights into the reasons behind these contrasting findings. Therefore, this study uses an authenticity-efficiency framework as a key lens to read the divergent findings in the literature related to service robots and WTP. To the best of the authors' knowledge, this is the first attempt to critically review the literature on the WTP for robot-delivered services in the T&H literature. The study replies to two main research questions: (1) What is known

about consumer WTP for robot-delivered in T&H services? (2) How can the divergences and contrasting findings present in past literature and related to the drivers of the WTP be explained?

2 Research methodology, data collection and data analysis

This study applied the PRISMA protocol [4] to systematically identify and analyse the relevant literature. Sources were searched on Scopus, Web of Science, and Google Scholar [5]. This was done using combined keywords related to the context (Tourism OR Hospitality OR Hotel OR Restaurant OR bar OR museum OR airport OR gallery OR exhibition OR Café OR nightclub OR "theme park"), the phenomenon (robot* OR "Artificial Intelligence"), and the concept ("willingness-to-pay" OR "reservation price" OR "Purchase behaviour" OR "Price accept*" OR "Accept* price" OR "WTP" OR "Willing* to pay" OR "price fairness" OR "fair* price") of the study. After excluding non-English and non-journal articles, 80 papers were identified. Screening based on the relevance of the article to the topic reduced this to 34 articles. Further quality checks led to a final selection of 32 articles. These checks were based on a deep reading of each paper in full to double-check its relevance to the topic

Regarding the analysis, the study uses past literature to provide a description of the results on the WTP for robot-delivered services and offers a thematic analysis of the drivers of the WTP based on the authenticity and efficiency framework.

3 Main results and discussion

3.1 Descriptive analysis of the findings

The analysed literature shows that there are three levels of WTP for a robot-delivered service compared to the reference price of a traditional service: (1) a WTP a premium price [3]; (2) a WTP the same price [6]; and (3) a WTP a discount price [7]. These different levels of WTP are associated with numerous driving factors whose effects on the WTP are, in some cases, contradictory across studies. Additionally, consumers value T&H services differently based on the service provider (robot vs human), and this affects their WTP [8]. Finally, different clusters of consumers exist based on their expressed WTP [3, 6, 7].

3.2 Thematic analysis of the findings

To organise and clarify the fragmented findings in the literature, this study proposes an authenticity-efficiency framework as a systematic interpretive lens. Substantially, the association of these two core tourism concepts has already been claimed to influence consumer behaviour [9]. Efficiency captures the operational side of service delivery, speed, reliability, and execution without failures [10] and authenticity reflects the experiential and symbolic value of service in terms of human touch, uniqueness and a

sense of reality [11]. Applying the framework, the literature was reorganised in four quadrants (see Tab 1). This reorganisation depends on the perceived gain or loss in authenticity and/or efficiency that provokes an increase or decrease in consumer WTP for robot-delivered service. The table also shows the coverage of each quadrant by the reviewed studies. It reveals an unequal exploration of the quadrants, with some of the quadrants receiving most of the studies, while others were investigated by very few studies. For example, Quadrant 1 was covered by 18 studies, while Quadrant 2 was covered by just one study. Additionally, while most of the studies fit the framework, a few of them (e.g., 07 studies) do not. Moreover, some studies fit more than one quadrant.

	Authenticity Gain (AG)	**Authenticity Loss (AL)**
Efficiency Gain (EG)	Quadrant 1 (EG & AG): Positive synergy (WTP increases) Number of studies: 18	Quadrant 3 (EG & AL): Efficiency - Warmth Trade-off (WTP decreases) Number of studies: 5
Efficiency Loss (EL)	Quadrant 2 (EL & AG): authenticity premium (WTP is neutral). Number of studies: 1	Quadrant 4 (EL & AG): Double issue (WTP decreases significantly) Number of studies: 4

Table 1. An illustration of an authenticity-efficiency framework that regroups and makes sense of the findings of the reviewed papers on the WTP for robot-delivered services in four quadrants. The table also shows the number of studies that fit in each quadrant (Source: Authors´ own elaboration).

In quadrant 1, consumers perceived both authenticity and efficiency gains, which created an increase in the WTP. Evidence shows that this positive synergy can be experience or context related. In the experience-related case, consumers perceived the interaction with service robots as futuristic [6], entertaining [3], more socially engaging [12], or as more human-like, especially in the absence of human staff [13]. In the context-related case, conditional elements favour the view of authenticity gain in terms of safety, like during the COVID-19 pandemic [14], or personal social status in association with a brand [8]. Feeling more comfortable in making a confidential request to a robot can also motivate a higher WTP [12]. This creates an intimate interaction in customer-robot interactions, which enhances consumer satisfaction and their WTP [15]. In this case, efficiency comes from perceived usefulness of the technology, while authenticity arises from the mechanical nature of the robot and its apparent neutrality (e.g., no social judgment as in the case with human staff) in handling sensitive tasks, thereby protecting confidentiality and privacy. Thus, these gains justify a WTP for a higher

price. In quadrant 2, there is a loss in efficiency while human-like-based authenticity gain remains quite equal [17]. This loss occurs, for instance, in the case of service failure [17]. In this situation, the WTP remains neutral and does not decrease, confirming the dominant role of authenticity in driving the WTP. In quadrant 3, there is a loss in authenticity, which decreases the WTP while efficiency gains remain unchanged, like in quadrant 1. That loss is driven by two main elements: (1) the presence of human staff, which makes the robot human-likeness more or less valuable [13]; and (2) the use of a machine-like robot, perceived as cold, in regular restaurants where more human warmth is expected [16]. Also in this case, authenticity is the primary driver since its loss causes the WTP to decrease. In quadrant 4, robot-delivered services are perceived as non-authentic (e.g., dehumanising) and non-efficient (e.g., risky) [18]. In this context, a major moderator of the effect of perceived efficiency on the WTP is the entity perceived as the primary beneficiary of automation, that is, whether it is the firm or consumers. For instance, when consumers perceive the use of robots as a cost-saving tool, they are willing to pay a substantially lower price [7]. Perceived risks, both for efficiency and authenticity-related reasons, can also cause a substantial decrease in WTP. For example, high levels of perceived psychological risk (e.g. technological anxiety), privacy risks (e.g., fear of losing personal data), and time risk (e.g., fear of wasting more time to learn to use service robots) negatively impact WTP [18].

In brief, this analysis shows that in the context of this technology in the T&H industry, authenticity is the main driver of the WTP for the service. This is because, depending on its variation, the WTP can change substantially while a change in efficiency provokes a much-limited effect. Within the framework, the findings also show the key moderating role of human presence, service style, and perceived automation beneficiary.

4 Directions for future research

Based on the findings, some directions for future research emerged. For instance, underexplored quadrants (e.g., Quadrant 2) suggest a limited understanding of situations in which efficiency is compromised, but authenticity is preserved. Therefore, future research may explore consumer WTP in such contexts, especially as service failures or inefficiencies become more common with the increased adoption of service robots in the industry [19]. Additionally, future studies could deepen the understanding of the opposing emerging views regarding the effect of service robots on privacy and confidentiality. They could examine how these opposing perceptions influence consumer WTP for a service. As shown in the findings of some reviewed studies, there were losses [18] and gains [12, 15] in authenticity due to privacy-related aspects. Moreover, as no studies consider longitudinal and cross-cultural dimensions, future research could investigate how customer perceptions of authenticity and efficiency of robot-delivered services evolve over time and across cultural contexts. This would be relevant given the fact that exposure to service robots is growing globally, even though such exposure is still unequal geographically and across cultural contexts. Finally, some studies do

not fit the framework, indicating that some dimensions influencing WTP are not captured by this interpretative lens. Therefore, future research could investigate the reasons for this mismatch, viewing this as an opportunity to refine or expand the framework.

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Making Effort Visible: Restoring the AI Source Penalty

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Abstract. Generative Artificial Intelligence (AI) has shifted content creation from a human-exclusive craft to prompt-based production, with tour-package itineraries now synthesized at scale by large language and multimodal models. As travel firms adopt AI-authored itineraries for cost efficiency and assortment breadth, a key question is whether consumers value these outputs like human-authored ones. Therefore, based on effort-as-information theory, this paper examines how effort-as-information operates when tour-package itineraries are authored by AI vs. humans. Across two experiments, we test whether making credible effort information salient restores the perceived effort for AI-generated content and increases willingness to pay. Our results indicated that participants viewing the same itinerary attributed lower perceived effort to AI than to a human author. Additionally, we found that when effort was increased, the linkage from perceived effort to willingness to pay was descriptively stronger in the AI condition than in the human condition. These results are consistent with the view that salient effort information mitigates (restores against) the AI penalty. We refine effort-as-information by specifying source-contingent diagnosticity and offer practical, designable interventions for AI itinerary communications.

Keywords: AI-generated tour packages, Effort-as-information theory, Effort information, Willingness to pay, Perceived effort

1 Introduction

The advent of generative AI signifies a paradigm change, challenging the traditional belief that creativity was exclusively a human domain [1]. For decades, the creation of content (e.g., plans, itineraries, editorials, and recommendations) was the domain of human specialists whose expertise integrated acquired knowledge, contextual discernment, and implicit understanding. Generative AI creates content by drawing on large language and multimodal models. It combines different data sources to produce outputs that resemble human-generated text [2]. In tourism, the tour package itinerary exemplifies this transformation. Traditionally, itineraries in travel packages were crafted by tour guides or specialist companies via empirical assessments and iterative planning [3]. In the age of generative AI, these tour products can be produced by AI algorithms that rapidly synthesize scattered knowledge.

Reflecting these capabilities, travel firms increasingly deploy AI-powered itineraries to achieve cost efficiency and assortment breadth, enabling more variants, faster updates, and personalization at scale [4]. Yet understanding AI's role in itinerary authorship requires going beyond its capacity to produce efficient or novel content. According to the effort-as-information [5], people infer quality and value from perceived effort embedded in an output. AI outputs are often perceived as mechanistic, algorithmic, and disembodied—lacking intentionality and human-like exertion [6]. Therefore, the source of authorship can shape how consumers evaluate ostensibly similar itineraries. If a tour package is generated by AI, the value of packages (i.e., perceived effort and willingness to pay) can be weakened. In this context, customers rely more on it as a diagnostic cue (i.e., effort information) in a tour package. Conversely, when credible high-effort information is made salient, the value of the product should be restored.

Despite the possibility that consumers' valuations vary with the source in the rapid diffusion of AI-authored itineraries or tour packages, the main limitation of the prior research is a lack of understanding of whether end users value AI-generated tour packages and itineraries to the same extent as human-created ones. To address this research gap, this research aims to examine whether highlighting effort information reduces the negative source effect of AI (vs. human) on willingness to pay by mediating perceived effort. Accordingly, we address the following question: Does making high (vs. low) effort information salient restore the value for an AI-generated (vs. human-generated) tour package?

2 Theoretical Background and Research Model

The effort-as-information perspective posits that consumers infer quality and value from the perceived effort embedded in an output [5]. Effort functions as a diagnostic cue that signals the cognitive energy behind a piece of content. When consumers perceive higher effort, they evaluate the content as more credible and valuable, which increases their willingness to pay. This inference is strengthened when the level of effort cues is high, visible, credible, and attributable to the producer [7]. In tourism settings, effort cues commonly appear in the creation of itineraries and recommendations. When an itinerary notes actions such as site checks, route comparisons, or personalization based on traveler needs, consumers infer meaningful cognitive and procedural effort. Similarly, hotel or restaurant recommendations that compare alternatives or reference verified reviews signal that the creator invested care and scrutiny. These tourism-specific cues illustrate how effort-as-information functions in itinerary design and strengthen the diagnosticity of effort for both human and AI authors. In AI contexts, however, effort cues are often obscured because AI is perceived as mechanistic and disembodied, with limited intentionality and human-like exertion [8]. Consequently, the diagnosticity of effort can be attenuated: the same nominal "effort information" can be underweighted when the author is AI rather than human. Based on these discussions, we model evaluations of tour-packages itineraries as moderated mediation consistent with effort-as-information.

As shown in Figure 1, the source of authorship (human vs. AI) shapes perceived effort, which in turn influences willingness to pay. The level of effort information (low vs. high) as the salience or visibility of process cues) moderates the way from the source of authorship to perceived effort. Because AI is often perceived as mechanistic and disembodied, consumers attribute less intentionality and exertion to AI authorship, lowering perceived effort relative to human authorship [9]. Hence, for otherwise similar itineraries, the source label alone should depress perceived effort in the AI condition. Therefore, we propose our hypothesis as follows:

H1: Perceived effort will be lower for AI-generated than for human-generated itineraries.

Making credible effort information (low vs. high) restores the diagnostic use of effort in AI contexts, raising perceived effort, particularly for AI-authored itineraries [8]. Thus, the AI–human gap in perceived effort should narrow when effort information is high. Expanding on these discussions, improvements in perceived effort under high effort information should dampen the AI penalty on willingness to pay through the mediator, yielding weaker conditional indirect effects. Under low effort information, the underweighting of effort cues keeps the AI penalty stronger. Therefore, we propose as follows:

H2: The level of effort information (low vs. high) moderates the effect of source on perceived effort.

H3: The indirect effect of source (AI vs. human) on willingness to pay via perceived effort will be more negative under low effort information and weaker under high effort information, indicating attenuation of the negative AI source effect when high effort information is salient.

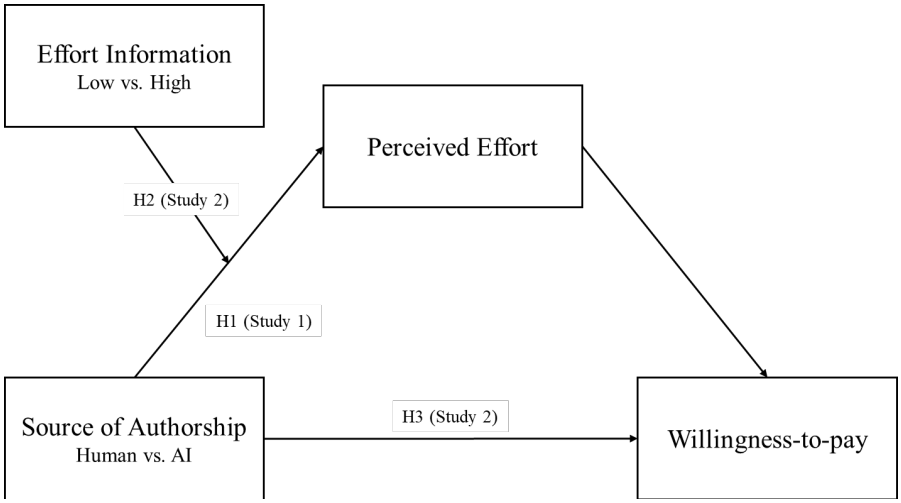

Fig. 2. Research Model

3 Methods and Results

3.1 Study 1

The purpose of Study 1 was to test H1, which is the source effect on perceived effort as evaluations of tour-package itineraries by comparing AI vs. human-generated authorship. We recruited 131 U.S adults via Cloud Research. Participants, asked to imagine a vacation plan to visit South Korea, were assigned to one of two conditions in a between-subjects design: authorship of the tour package (human vs. AI). They were then asked to assess perceptions of effort [9], manipulation check, and perceived realism, using a 7-point Likert scale. The perceived realism and manipulation of the source of authorship were successful. A one-way ANOVA revealed a significant effect of the source on the perceived effort (F (1, 140) = 8.49, p = .004, η^2 = .062). The participants' perceived effort of the tour package was higher for the human-created ($M_{\_human}$ = 4.78) than the AI-generated condition ($M_{\_AI}$ = 3.90), supporting H1 that perceived effort is lower for AI-generated than human-generated itineraries.

3.2 Study 2

Study 2 examined the interaction effect of the source and the level of effort information to confirm H2 and H3. With a total of 281 U.S. adults, the overall procedure for this study closely reflected that of Study 1. By employing a 2 (source: human vs. AI) x 2 (level of effort: low vs. high) between-subject design, participants were randomly assigned to one of four groups, as shown in Figure 2. They were then asked to assess willingness-to-pay as outcomes with an open question [10], and other variables were evaluated with the same measurement.

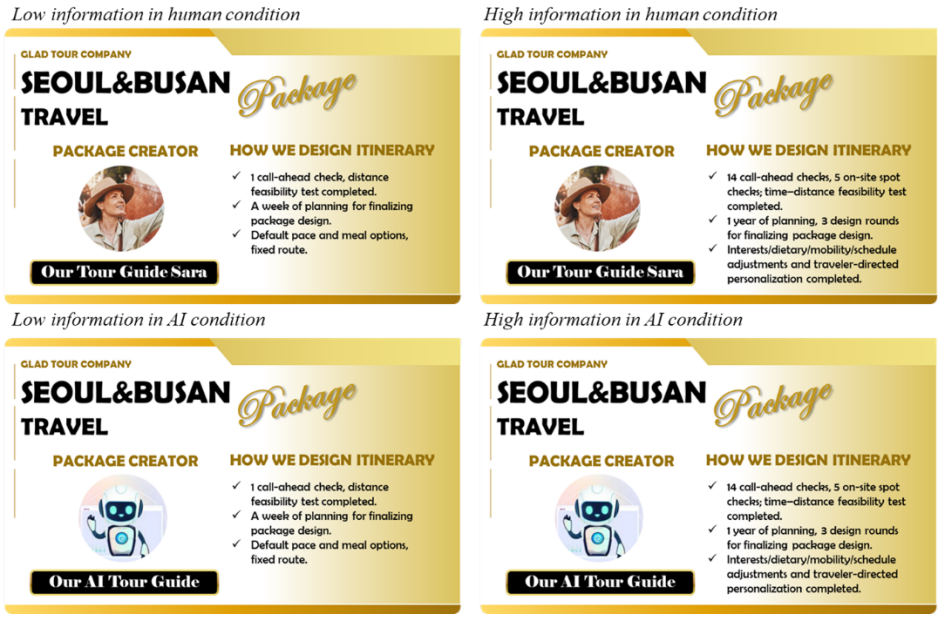

Fig. 3. Stimuli of Study 2

The perceived realism and manipulation check were successful. For testing H2, we conducted a 2-way ANOVA. The main effects of the source and the level of information were significant. Importantly, the significant interaction effect between them was found on the perceived effort (F (1, 273) = 4.12, p =.043, η^2 = .015) as shown in Figure 4. We also conducted a mediated moderation analysis using Model #7 of Hayes [11] macro with 5,000 bootstraps to confirm H3. The overall mediated moderation was significant. The mediation of perceived effort was significantly positive on willingness to pay, whereas the direct effect of the level of effort information was not significant. The conditional indirect effect of effort information on willingness to pay via perceived effort was significant for both human and AI sources and was descriptively larger for AI (Human: 12.80, 95% CI [0.68, 30.01]; AI: 29.97, 95% CI [3.58, 66.08]), supporting H3.

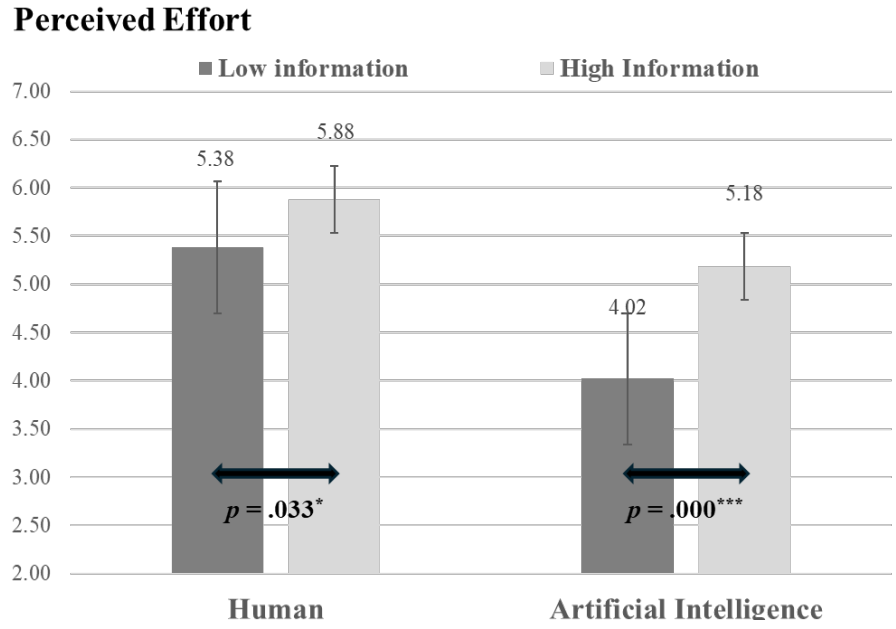

Fig. 4. Results of Study 2

4 Conclusions

By conducting two empirical studies, we demonstrated that although participants viewed the same itinerary, they judged the human-generated version as involving more effort than the AI-generated version. The level of effort information moderated the Source on Perceived Effort link: under low effort information, the AI (vs. human) deficit on perceived effort was larger, whereas under high effort information, this deficit attenuated. Additionally, we found that when effort was increased, the linkage from perceived effort to willingness to pay was descriptively stronger in the AI condition than in the human condition. These results are consistent with the view that salient effort information mitigates the AI penalty.

These findings make a significant contribution from an academic and practical perspective. By applying effort-as-information [5] in an AI-generated product context, this research demonstrated that the diagnostic use of effort information is contingent on authorship. This refined the theory by specifying when (low vs. high effort information) and for whom (human vs. AI) the heuristic functions. We also extend AI-evaluation research to high-involvement experience contexts and illustrate how moderated mediation can reveal **repair mechanisms** for AI penalties. Especially, perceived effort emerged as the proximal driver of willingness to pay by highlighting it as the operative pathway in AI evaluation, not generic AI aversion [9]. In practice, we show that firms can mitigate the AI source penalty not by changing the itinerary itself but by designing

the visibility and credibility of effort (e.g., iterations/time, verified sources, constraint satisfaction), thereby lifting willingness to pay for AI-generated offerings.

This research has several limitations that suggest avenues for future work. First, our operationalization of effort information focused on task-based indicators such as checks, iterations, and planning duration. Other forms of effort cues (e.g., emotional labor, creativity, or data-driven computation) could be examined to determine whether consumers weigh them differently for AI and human sources. Additionally, future studies could explore additional boundary conditions, such as AI familiarity, trust in algorithms, or the type of tourism product, to better specify when effort information most effectively mitigates the AI source penalty.

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Virtual & Immersive Technologies

Electrodermal activity in VR tourists under different virtual travel modalities

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Abstract. Virtual reality tourism (VRT) is expected to become a major disruptor of the industry, providing capabilities of no-impact travel to vulnerable, expensive, dangerous, or hard-to-reach destinations. While several studies have surveyed prospective tourists on their willingness to engage in VRT, their reliance on self-reported data has limited the objectivity of these findings. We employed electrodermal activity (EDA) biosensing to investigate affective engagement in VRT in participants exposed to two VR experiences: a realistic museum visiting and a *hyperreality* immersion into the paintings' world. The participants were surveyed to assess their authenticity orientation (realist vs. constructivist), age, gender, and engagement with the VR experience. We found a heightened sympathetic neural activity during the hyperreality video, validating the sensitivity of EDA to differentiate between VRT modalities. The EDA measures indicated participants' object-based authenticity modulated responses related to VRT modality and complemented participants' survey responses.

Keywords: VR tourism, biosensors, affective engagement, authenticity.

1 Introduction

The scholarly debate about the future of tourism has started from the very inception of virtual reality (VR). Some academics envisioned a complete replacement of physical travel with VR tourism (VRT) [1], while others warned of mental health risks from blurred reality boundaries [2]. Until consumer-grade VR systems became widely available, these discussions were mostly theoretical rather than based on empirical research [3]. Meanwhile, the experimental VRT studies emerging from the 2010s and examining the presence, mental imagery, and behavioral intentions [4, 5] still relied on self-reports of VR experiences. Few accounted for personal traits like tourist authenticity orientation (TAO)—a key concept in tourism motivation and perception. Meanwhile, without biometric data such as heart rate or electrodermal activity (EDA), real-time affective engagement with VRT remains elusive [6].

To address the methodological gap, this study explores the following research questions: (1) Does affective engagement of VR users as measured by EDA sensors differ in traditional (replicating real-world) and hyperreality (imaginary environment) VRT experiences?; (2) Does EDA differentiate between the affective engagement of VR users based on their attitudes toward authenticity in tourism?, and (3) Do EDA indices

relate to self-reported affective engagement of VRT tourists? To answer these questions, the study immersed participants with attached biosensors into two controlled VRT environments.

2 Literature Review

Affective engagement in VR reflects the emotional connection, response, and involvement users feel in VR environments. In turn, these feelings are intertwined with autonomic nervous system activity. Notably, the sympathetic system, which is associated with the "fight-or-flight" responses and activates during states of fear, anger, or excitement, is a correlate of emotional arousal. On the opposite side, the parasympathetic system, which promotes "rest-and-digest" activities subsiding the arousal, relates to the emotional states of calmness and safety [7, 8].

Multiple authors have established a connection between the emotional states and markers of nervous system activity, mostly the heart rate variability [8], pupil dilation [9], and EDA [10]. EDA measures dynamic changes in skin electric conductance in response to sweat gland activity, which in turn is innervated by the sympathetic nervous system, reflecting the emotional arousal. In tourism, a good starting point is a review of 25 papers [11]. Results, however, are mixed. A study of a street walk found the walk's time and location effect on EDA [12]. A similar effect was found in a comparison of watching a video on a desktop and a VR set [13]. Meanwhile, [14] reported that the EDA was ineffective in measuring tourists' emotional reactions. A study exposing VR travelers to an immersive semi-circle video environment [15] found a limited relationship between the EDA and self-reported measures.

Few studies have applied biosensors in VRT research, and none have examined tourists' attitudes toward authenticity—a long-standing central concept in tourism motivation. Authenticity orientations—realist, constructivist, and postmodernist—shape how travelers value experiences: realists seek factual accuracy, constructivists negotiate authenticity, and postmodernists prioritize enjoyment and sensory stimulation over historical accuracy and originality (see review and descriptive profiles of these orientations in [16]). This study investigates whether authenticity orientation moderates VRT responses across two environments: realistic simulations of tourist experiences and hyperreal immersions where boundaries between real and simulated are deliberately blurred.

3 Methods and Data

Participants (university students, N=42, median age 24 years, equal representation of males and females) were exposed to two VR videos with identical technical quality. One emulated a visit to the Amsterdam Van Gogh Museum (Traditional). The other presented an immersion into the imaginative world of Van Gogh's paintings (Hyperreality). The videos were viewed in a randomized order. The participants wore Oculus Quest 2 headsets; EDA measurements were collected with the Shimmer3 GSR+ unit.

The latter was modified to allow data collection from palms rather than fingers to reduce artefacts from finger movements in a VR environment. A pre-test, post-test1, and post-test2 surveys were conducted to determine participants' demographics, TAO, and engagement/disengagement with the VRT experience. Since the pre-test uncovered only two postmodernists, they were joined with the constructivists into the CONST group (N=19; for support see [19]. In data analysis, this group was compared with realists (REAL; N=23).

The VR affective engagement (7-item Likert scale) was reported as follows.

Engagement: The mean of (1) *I was completely captivated by the video*; (2) *I enjoyed the VR experience of Van Gogh's masterpieces*; and (3) *I felt connected with the history of art and human creativity through this VR experience*.

Disengagement: The mean of (1) *I find myself preoccupied with thoughts unrelated to the VR experience*; (2) I find it difficult to stay focused on the artwork or presented information; and (3) *Dizziness during VR viewing did not let me fully engage with the VR experience*.

The EDA data was processed with a custom script using the NeuroKit2 Python library. The data from each participant under each setting were cleaned and decomposed into three event-nonspecific measures recommended in the neuroscience research [19]:

M1: Number of skin conductance responses (fast signal peaks) per minute. M1 varies from 1-2 peaks per minute in a calm state to >20 peaks in high arousal.

M2: EDA spectral power in the sympathetic activity band (.045 – 0.25 Hz). The higher value of M2 indicates a stronger sympathetic activation of the sweat glands, reflecting a greater level of arousal in a person.

M3: Normalized M2 (M2 divided by the maximum spectral power).

After the log-transformation of M2 and M3, all three measures were found to be normally distributed using the Shapiro-Wilk test.

Three differential measures **D1**, **D2**, and **D3** were computed as differences in the respective M1, M2, and M3 values for Hyperreality and Traditional settings. In addition, D1` was computed as a normalized D1 measure. Hence, D1 and D1` measured the Hyperreality–Traditional difference in fast signal peak frequency, while D2 and D3 measured the difference in sympathetic activity.

4 Results

4.1 RQ1: EDA in Traditional and Hyperreality VR, within-group comparison

A one-group two-tailed T-test was applied to the differential variables, which showed a statistically significant difference in participants' sympathetic activity under the Hyperreality and Traditional stimulation (D2: mean=0.5; T=2.06; p=0.046; D3: mean=0.68; T=3.43; p=0.002). The difference in the EDA peak frequencies was not statistically significant (D1: mean=-0.63; T=-0.63; p=0.135; D1`: mean=-0.03; T=-1.68; p=0.102). Results indicate that the signal's power spectral density in the spectral band related to sympathetic activity is higher and "more concentrated" in the Hyperreality setting.

4.2 RQ2: EDA in TAO groups, within- and between-group comparison

While the previous section investigated the difference between the EDA measurements for all participants (N=42), this section compares the two TAO groups. In the within-group comparison, a one-group T-test was applied to the differential variables with the Null hypothesis that the difference between the Hyperreality and Traditional settings is zero. The outcomes (Table 1) show a statistically significant difference in the differential EDA measures between the realists and constructivists only for the normalized peak frequency D1`.

Table 2. Hyperreality minus Traditional EDA measures for realists (REAL) and constructivists (CONST) groups: means; T-statistics; p-values for the Levene and Shapiro-Wilk tests.

Measure	Mean: REAL; CONST	T stat.	Levine	Shapiro-Wilk
D1	0.57; -1.11	T=1.53 (p=.136)	p=.171	p=.583
D1`	0.01; -0.06	T=2.10 (p=.044)	p=.096	p=.929
D2	0.25; 0.69	T=-0.91 (p=.372)	p=.856	p=.694
D3	0.31; 1.10	T=-2.01(p=.053)	p=.159	p=.074

While the test power is heavily affected by the group sizes (N=23 and N=19), the mean D2 and D3 values indicate that constructivists have a higher Hyperreality-Traditional difference in sympathetic activity compared to realists. A between-group comparison reveals that this observation is primarily attributed to constructivists' increased sympathetic activity in Hyperreality setting; meanwhile, realists' sympathetic activity changes little on average (Table 2).

Table 2. EDA measures for realists (REAL) and constructivists (CONST) groups.

Measure	Traditional setting		Hyperreality setting	
	Mean: REAL; CONST	T stat.	Mean: REAL; CONST	T stat.
M1	6.46; 6.94	-0.62 (p=.539)	6.9; 6.7	0.14 (p=.893)
M2	-6.38; -8.06	2.34 (p=0.24)	-6.19; -7.49	0.14 (p=.060)
M3	-7.77; -6.57	-1.38 (p=.177)	-7.23; -5.37	-2.2 (p=.035)

4.3 RQ3: Affective engagement: EDA and self-reported measures

Survey answers to the affective engagement questions were found to be moderately correlated (using Pearson's $r>0.30$; $p<0.05$ criterion) with the EDA measures of sympathetic activity, but only in the Traditional setting (M2: r=-.34; M3: r=.36). In contrast, the disengagement questions were found to be moderately negatively correlated with the number of EDA peaks per minute (M1), but only in the Hyperreality setting (r=-.39). For robustness, we confirmed these observations using non-parametric Spearman regression with similar outcomes.

5 Discussion

The study demonstrated that the electrodermal activity (EDA) measures are sensitive enough to discriminate between different VRT settings. The comparison of EDA in the Traditional and Hyperreality settings suggested that sympathetic nervous system activity was measurably higher in the Hyperreality condition, confirming the earlier comparison of desktop and VR travel videos [13]. Our results suggest that highly immersive hyperreality VR environments, which rely on intensified sensory and emotional stimulation, tend to elicit stronger arousal than less immersive VR settings.

This relationship is modulated by the participants' orientation towards the object-based authenticity in tourism. While both groups demonstrated a stronger arousal in Hyperreality compared to Traditional VR, the constructivists' effect was evidently larger. The elevated arousal among constructivists in hyperreality suggests that technologically mediated authenticity resonates more strongly with audiences attuned to interpretive engagement rather than objective originality, extending the findings of [16] and bridging conceptual debates on authenticity with objective physiological evidence.

The EDA measures correlate with survey outcomes, albeit with a caveat. In the Traditional VR condition, the negative correlation between M2 and affective engagement suggests that *higher* engagement was associated with *lower* sympathetic arousal (section 4.3). Combined with outcomes of the between-subjects comparison (section 4.1), this may indicate that some participants, who felt highly captivated by the realistic, art-focused Traditional video, experienced a state of calm, absorbed immersion, akin to a "flow" experience in which viewers' attention is deeply focused and distractions are minimized, rather than a state of heightened stress or excitement. This interpretation aligns with psychophysiological evidence of an inverse U-shaped relationship between arousal and flow [19]. Notably, this relationship was less pronounced in the more intense Hyperreality setting.

Overall, the study demonstrates that the individual's authenticity orientation not only predicts attitudinal and behavioral responses but is also mirrored in participants' arousal patterns, objectively identified through EDA. This affective engagement emerged in two distinct forms: a calm, flow-like immersion in Traditional VR and heightened arousal in Hyperreality VR. Practically, the results suggest that VR developers and destination marketers may tailor immersive content to audiences seeking symbolic and/or interpretative authenticity, while also minimizing design features that provoke distraction or discomfort. The study highlights the feasibility of integrating biosensors into VRT research and lays the groundwork for more robust, physiologically grounded analyses of tourist engagement in virtual environments.

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Virtual Hospitality: Materiality, Fantasy and the Appeal of Spaces in the Metaverse

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Abstract. This paper explores the evolving role of virtual hospitality in the metaverse, focusing on the interplay of materiality, fantasy, and guest engagement with hotel spaces. Drawing on two focus groups (N=15), we investigate how users perceive and negotiate value in virtual hotels, from digital twins of iconic properties to surreal, imaginative environments impossible in the physical world. Findings reveal three dominant themes: (1) escapism and the appeal of fantastical design beyond replication, (2) the metaverse hotel as a social and co-created space, and (3) experience-led engagement that outweighs brand-led incentives. Participants emphasized immersive design and social connectivity as primary motivators, while traditional brand associations or cross-world benefits played a secondary role. The study contributes to hospitality theory by foregrounding materiality and authenticity in post-material environments and offers practical insights for digital hospitality innovation at the intersection of design, technology, and consumer psychology.

Keywords: Metaverse hospitality; Virtual tourism; Escapism

1 Introduction

The metaverse is a virtual environment where users own their respective avatars, in analogy to the user's physical self, to experience an alternate life in virtuality that is a metaphor of the user's real worlds (Gursoy et al., 2022; Lee at al., 2024). Such immersive technologies are used by hospitality operators (Fan et al., 2022) to create and monetize virtual hospitality experiences to reach new markets, boost brand awareness, image, and customer relations (Guillet & Penfold, 2013).

Moreover, the metaverse offers more engagement and frequency of interaction with brands such as hotels, participating in virtual room tours, attending virtual events, or gamification (Shin et al., 2025; Yung et al., 2021). Hospitality designers can now choose to reproduce "digital twins" of physical hotels, mimicking iconic features such as the marble lobbies of The Ritz, the skyline panoramas of Park Hyatt Tokyo, or the beachside serenity of Maldives resorts.

In this emerging context, material affordance, authenticity, and escapism are reshaping hospitality design and consumption. Material affordance emphasizes how digital environments simulate and transform sensory and architectural qualities, while authenticity examines whether virtual experiences build credibility or risk diluting luxury. Escapism highlights the psychological appeal of immersion, where value lies in comfort and familiarity as well as in imaginative transcendence. Together, these dynamics challenge traditional notions of hospitality, extending them into a post-material, hybrid reality.

This paper investigates guest preferences in virtual hotel settings, exploring how users negotiate their choices and hierarchies of value in virtual hotel settings while focusing on the increasingly critical concept of materiality in the metaverse. By engaging with empirical data, this research study provides insight into how material affordance, authenticity, and escapism are reshaping hospitality in the digital era. The implications extend to both hospitality design theory and practice.

2 Literature Review

Hospitality is about immersive, meaningful and sensory-filled experiences, all characteristics that lend themselves well to the metaverse affordances (Dwivedi et al., 2022). Various industry players continuously increase their investments on metaverse applications including marketing and guests' experiences (Dwivedi et al., 2022) to enhance brand loyalty and customer attachment (Yung et al., 2021).

Recent studies underscore the complexity of the design of hotel spaces in virtual worlds. Gursoy et al. (2022) and Lee et al. (2024) detail how the metaverse dematerializes the concept of place and object, freeing hospitality from concerns of scarcity, access, and logistics. The digital environment is not merely a replication of the physical, but it can be considered as a reconfiguration of materiality, where new forms of spatial and sensory affordances can emerge. Immersive hospitality experiences, virtual events, social gatherings, and even virtual co-working are among the most in-demand activities in the metaverse. Major hospitality organizations have begun investing in digital expansion, suggesting that the metaverse is increasingly being positioned as an experiential domain, blurring the boundaries between service innovation and spatial design.

Hospitality design involves designing a cohesive and engaging guest experience by strategically using architectural elements, lighting, materials, furniture, and storytelling to create a distinct atmosphere and evoke a specific emotion or theme within the space. Consumers have different aesthetic cognitions towards the sensory properties of nature such as a hotel’s color, textures and built-in landscapes. Xie et al. (2022) found that familiarity, expectations, context, and cultural background are all factors that feed into visitor interpretations of hotel’s aesthetic architecture.

Fantasy and surreal experiences in the metaverse are one of the most notable features that users enjoy (Yoon et al., 2024). They have been singled out as particularly popular with digitally native, younger guest segments, who view identity and escapism as fluid and experiential. Thus, escapism becomes an added value and a central experiential

driver, where guests pursue environments that extend beyond realism into the extraordinary.

3 Method

A focus group (FG) approach was chosen to gain a rich understanding of user experiences, opinions, beliefs, and concerns in metaverse hotel spaces. FGs are particularly useful in interpreting new phenomena that can be superficially understood (Morgan, 1998). Group dynamics and negotiations of opinions can help to build on the expression of experiences among participants (Barbour & Kitzinger, 1999). Two focus groups were conducted (N=14) to investigate the study themes in-depth. Both focus groups examined the same questions.

The data collection was conducted during February 2024 via Microsoft Teams. Participants were recruited through social media based on their prior experience and usage of Metaverse platforms. In exchange for participation, a £30 Amazon voucher was offered as an incentive. Participation criteria included having at least one month user experience with any metaverse platform including Decentraland, Fortnite, Horizon Worlds, etcetera.

Age	N	%	Gender	N	%
18-25	1	7.10%	Male	7	50%
26-35	13	92.90%	Female	7	50%

Two researchers facilitated each session. At the start of each FG, proper protocols were outlined, and each FG was recorded and transcribed. Participants were shown examples of hotel brands that existed both solely in the metaverse as well as hotels that had replications of their physical hotels in the metaverse. The discussions aimed at eliciting interaction among participants, allowing them to freely express their views and exchange perspectives and experiences, (Morgan, 1998; O.Nyumba et al., 2018).

Thematic analysis was used by the research team to analyse the transcripts. The orientation was primarily semantic with selective latent interpretation, and largely inductive with light use of sensitising concepts from telepresence/social presence, authenticity, and escapism. Below, we describe the followed process of thematic analysis:

1. Familiarization: both researchers read transcripts end-to-end and wrote memos.
2. Generating codes: line/turn-level coding capturing actions, evaluations, and design/usage judgments.
3. Searching for themes: clustering codes around patterned meanings (e.g., imaginative materiality; social/work utility; brand/reward value; risks & adoption barriers).
4. Reviewing themes: checking coherence within themes and distinctiveness between themes; seeking disconfirming evidence.
5. Defining/naming themes: final labels emphasise the ‘work’ each theme does in explaining engagement.

6. Producing the report: assembling theme narratives with illustrative quotations (lightly edited for clarity), linked to RQs.

4 Findings & Discussion

The findings reveal three key themes that extend existing theoretical frameworks. Each theme contributes to an understanding of how consumers engage with metaverse hospitality experiences and provides insights for both theory and practice.

4.1 Escapism and Experiential Design: Beyond Digital Replication

Participants consistently expressed strong preferences for imaginative, visually rich, and fantastical metaverse hotel designs (e.g., Babylonian gardens) over digital twins of real-world hotels. The opportunity to *escape* into naturalistic or extraordinary environments was described as a primary motivator for visiting.

"*The view is beautiful… as a lover of nature, you want to go there—the green, the water.*" [FG1-P3]

"*This is mind-blowing… I'd really like to visit to check and see how it looks*." [FG2-P4]

Participants' strong preference for imaginative and fantastical metaverse hotel environments aligns with escapism theory (Pal & Arpnikanondt, 2024; She et al., 2025). In hospitality theory, escapism is widely recognized as a core motivational driver, conceptualized as the desire to withdraw from everyday reality. Radia et al. (2025) highlight that such cognitive disengagement is a key antecedent to virtual world engagement and can enhance both hedonic and eudaimonic wellbeing. While traditional escapism theory focuses on physical displacement from routine environments, emerging research on virtual escapism points instead to imaginative materiality, the capacity of virtual environments to transcend physical constraints and offer fantastical experiences impossible in the real world (Buhalis et al., 2023). This shift demonstrates that the perceived realism and immersive quality of virtual environments significantly shape user engagement and behavioral intentions. Yet, this dynamic appears more complex in hospitality-specific metaverse contexts. Kim et al. (2025) found that metaverse hotels function less as sites of escapist withdrawal and more as spaces that facilitate social connection, inclusion and participatory engagement.

4.2 Service-Dominant Logic and Co-Creation of Value in Virtual Spaces

"*Someone like me that loves to chat… I'd love to visit the lobby*." [FG1-P3]

"*The benefits matter a lot… you can use that [space] if you have to work remotely*." [FG1-P5]

This theme reframes the metaverse "hotel" into a social platform, enabling presence, conversation, and productivity. Participants valued metaverse hotels most when they functioned as spaces for interaction and remote work, thereby extending the role of hospitality into sociality and connectivity. The emphasis on lobbies as social spaces

particularly resonates with the finding that intrinsic/extrinsic enjoyment value, representing tourists' social and personal aspects of value co-creation, explains the largest portion of variance in online experiential value. Additionally, users in the metaverse can co-create the spaces themselves. This democratization of space is part of what makes alternative environments so compelling; as they are living social laboratories shaped by the people who use them (Buhalis et al., 2023).

4.3 Experience-Led Engagement versus Brand-Led Incentives

Few participants had prior awareness of metaverse hotels created by established brands (e.g., Marriott's Citizen M). Nevertheless, when introduced to the concept, some valued cross-world incentives, such as NFT purchases granting discounts or perks at physical hotels. However, this benefit was perceived to be secondary to the strength of the immersive experience itself.

"It depends on the benefits… it's really cool if you can get it." [FG2-P4]

(*When asked if real-world rewards change destination choice) "No."* [FG1-P3]

This theme challenges traditional brand loyalty, showing that immersive experiences often trump extrinsic rewards in virtual settings. Recent research support our findings, demonstrating that gamification in the metaverse influence brand satisfaction, hedonic value, utilitarian value, and user engagement (Hsu & Chen, 2018).

5 Conclusion

This study aimed to explore guest preferences in virtual worlds. Despite the themes identified, this research remains exploratory in nature. The area of surreal and alternative spaces for hospitality and leisure is still developing, and there is potential for further research. This can include measurable psychological or emotional benefits of metaverse's alternative spaces, and emotional connection to fantastical environments versus traditional hospitality spaces.

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VR Experiences Across the Tourism Customer Journey: Evidence from a Multi-Stage Field Study

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Abstract. This study explores how Virtual Reality (VR) influences visitors' intentions to recommend a cultural destination through a longitudinal investigation involving actual visitors and two stages of the customer journey (CJ): the on-site experience and the post-visit phase. Specifically, it compares the use of VR and 2D media after the visit to assess their effects on presence, ease of imagination, and subsequent behavioral intentions to recommend the destination. Furthermore, physiological arousal, through its effect on memorability, and memorability itself measured during the on-site visit are considered predictors of post-visit intentions, linking the two CJ phases to examine how past experiences shape future decision-making. Preliminary results show that VR elicits higher presence, that positively impacts ease of imagination, leading to increased intentions to recommend cultural institutions. Moreover, memorability of the on-site VR experience positively contributes to post-visit recommendation intentions, confirming the existence of a temporal link between the phases. Initial findings highlight VR's potential as a marketing tool across multiple stages of the CJ, offering practical insights for tourism managers.

Keywords: VR, Virtual Reality, Customer Journey, Multi-Stage, physiological arousal.

1 Introduction

Virtual Reality (VR) is transforming cultural tourism by offering immersive experiences that enhance visitor engagement and create new business opportunities for destination managers [1]. Through VR headsets users can, for instance, virtually travel across time and explore heritage sites in interactive ways [2], obtaining a higher-quality visiting experience [3]. Owing to its potential and growing demand, VR has gained increasing attention from both scholars and practitioners [1]. Prior research highlights its role across the customer journey (CJ) [2]: showcasing destinations before the visit [4], enabling immersive time-travel experiences during the visit [2], and supporting memory recall after the visit [3].

Recent research has explored VR as a communication and destination marketing tool, analyzing how different devices (e.g., VR headsets vs. 2D monitors) and content

types (e.g., 360-degree vs. traditional videos) impact user responses [5], [6], [7]. Findings indicate VR can be a powerful advertising instrument, able to elicit stronger behavioral intentions to visit and recommend the destination than traditional media [5], [6]. However, most studies focus on the early stages of the CJ [1], relying on single exposures that only capture immediate reactions either before or during the visit [5], [6], [7], [8], [9]. Yet, the market today offers a growing range of accessible devices (e.g., portable headsets and inexpensive smartphone-based supports) enabling users to relive their VR experiences at home after the visit. This opens new opportunities to explore how repeated exposure over time influences post-visit advocacy and behavioral intentions [1], [10]. Despite this, there is no longitudinal study investigating the impact of multiple VR experiences across different time frames. This would advance theoretical understanding of the mechanisms shaping tourists' behavioral responses and inform destination managers on how to sustain long-term engagement through VR.

Also, academia is calling for research on consumer behavior related to immersive experiences [8]. This is particularly relevant as VR is an inherently experiential technology, able to offer high sensorial stimulation [9], resulting in strong emotional responses. However, as emotional processing is mostly unconscious, and self-reported measures may offer limited visibility, researchers have started employing physiological tools to obtain more objective responses [5]. In this regard, numerous contributions employ the Stimulus-Organism-Response (SOR) model [5], [11], [12] to map the relationships between sensory inputs (VR experiences), internal processing, and human reactions. Furthermore, to offer solid insights on VR for destination marketing, research in real-world settings is needed [1]. Despite this, most contributions are based on single-method, controlled laboratory studies with a student population, potentially limiting ecological validity and managerial implications [1].

This study addresses these gaps by (i) exploring the impacts of VR across the visit and post-visit phases of the CJ, (ii) applying the SOR framework to examine how repeated exposure to VR content influences post-visit behavior of actual visitors in an ecologically valid context. In particular, this study aims at comparing the effectiveness of portable VR and 2D display formats in stimulating post-visit advocacy, considering visitors' prior on-site VR experiences. This research in progress aims to offer several contributions. Theoretically, it is expected to advance understanding of VR's role across multiple stages of the CJ, empirically testing its use as a visitor-retention tool after cultural visits and examining repeated exposure to VR content. Methodologically, it conducts research in a real cultural institution and employs physiological tools for objective measures. For managers, it identifies key factors shaping visitor behavior, providing insights on how to leverage VR as a strategic marketing instrument to foster post-visit engagement and stimulate recommendations.

2 Conceptual model and hypotheses

This study applies the SOR model [11] to link on-site and post-visit responses. As Stimuli, we use VR and 2D display; as Organism, consistent with prior research [5], [13], presence and ease of imagination; as Responses, behavioral intentions to recommend

the destination, examining how different technologies shape consumer behavior. Presence is central to VR experiences [14] and previous research shows VR headsets can elicit a stronger sense of presence than 2D displays before the actual visit [5]. Building on this, and considering the post-visit stage, we propose the following hypothesis:

H1. VR headsets elicit a stronger sense of presence than 2D displays in the post-visit phase of the CJ.

Presence influences behavioral intentions by enabling visitors to vividly imagine real experiences within virtual environments [13], enhancing ease of imagination, a metacognitive process reflecting how easily virtually presented environments can be envisioned [15]. Prior results show a positive relationship between presence and ease of imagination [13]; building on this, and focusing on the post-visit stage, we propose:

H2. Presence positively impacts ease of imagination in the post-visit phase.

Ease of imagination is one of the key variables in VR literature, as the better visitors can imagine and evaluate an experience, the better they can make behavioral decisions [15]. Prior research highlights this as one of the key drivers of behavioral intentions [13], therefore, we formally propose:

H3. Ease of imagination positively impacts intentions to recommend the destination in the post-visit phase.

Post-visit responses are also influenced by prior experiences, called "experiential warehouse," encompassing cognitive and emotional processing [16]. In this study, it will refer to visitors' on-site experiences. Prior research has highlighted the role of memorability [17] elicited by tourism experiences in driving intentions to recommend a tourism destination, and of arousal in driving said memorability [18]; therefore, we propose:

H4. Physiological arousal deriving from the on-site VR experience positively impacts the memorability of said VR experience.

H5. Memorability of the on-site VR experience positively impacts post-visit intentions to recommend the destination.

3 Methodology

A real-world longitudinal field experiment on actual museum visitors was conducted in two phases. On-site at the San Lorenzo Archaeological Museum in Cremona, Italy; and at home one day later, where visitors engaged with additional content, without receiving any incentives.

Upon arrival at the museum, visitors who agreed to participate provided informed consent and were introduced to the study procedures. They then experienced a five-minute VR exploration of a reconstructed Roman domus, whose remains are exhibited in the museum, via a Meta Quest 2 headset. Physiological arousal was collected through a Shimmer3 GSR+ device. Immediately afterward, participants completed a short survey assessing the memorability of the visit.

Participants were then randomly assigned to one of two experimental groups for the post-visit phase. Group 1 received a cardboard VR device, while group 2 did not. Before leaving the museum, all participants received a flyer containing QR codes linking to additional museum content and online surveys, with instructions to access them one

day after the visit. The post-visit content consisted of a 360-degree VR video designed as a museum advertisement. Group 1 watched the video via the cardboard device, while group 2 experienced it in 2D vertical format to replicate current social-media standards. After viewing, all participants completed an online survey. Memorability, presence, ease of imagination, and behavioral intentions were measured via 7-point pre-validated Likert scales in online surveys during on-site and post-visit experiences. Physiological arousal was assessed using iMotions software counting emotional activation peaks per minute during the on-site VR experience [5].

4 Preliminary results and discussion

As the project is ongoing, these results are preliminary and may change as more data are analyzed. At the time of writing, eighty-seven visitors participated in the on-site VR experience, with 71 (56% F, Mage = 34.8, SD = 12.9) completing both phases. Constructs were checked for reliability, and VIF, before a PLS-SEM analysis was conducted in SmartPLS. Results are shown in Figure 1.

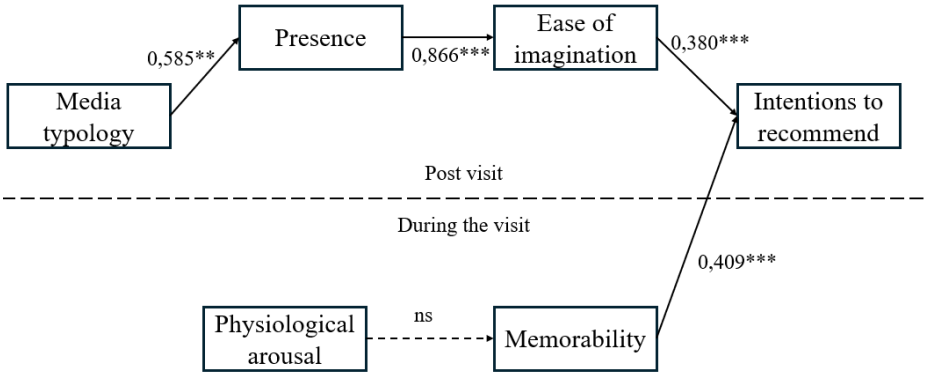

Fig. 5. PLS-SEM results (R^2=0.421; ***p<0.001; **p<0.01; ns non-significant)

Preliminary results show VR post-visit content increases presence, supporting H1, which positively affects ease of imagination, confirming H2 and, in turn, intentions to recommend the destination, supporting H3. Physiological arousal does not predict memorability, leading to the rejection of H4, while on-site VR memorability significantly drives post-visit recommendation intentions, confirming H5.

Initial findings potentially contribute to literature in several ways. They confirm that VR impacts multiple phases of the tourism CJ and support the SOR model as a theoretical framework [5]. They highlight the role of visitors' experiential warehouses [16], emphasizing repeated VR exposure to reinforce long-term behavioral intentions [10]. Addressing calls for real-world studies [1], the study also shows that physiological

arousal does not significantly influence memorability, suggesting, despite being emotionally intense, an immersive experience is not necessarily remembered. Likely, both cognitive and emotional factors concur to the memory formation process [18], signaling the necessity for an additional perspective.

For destination managers, this study shows VR can serve as a powerful marketing tool, highlighting the on-site experience as an initiator of post-visit actions. Therefore, destination managers should adopt a customer journey perspective, linking on-site and off-site experiences to enhance visitor engagement.

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Virtual Reality and Women's Solo Travel: A Self-Determination Theory Perspective

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Abstract. This study explores how virtual reality experiences influence women's intentions for solo travel through Self-Determination Theory. Female travelers often hesitate to travel alone due to safety concerns, social pressure, and low confidence. Using VR as a "mental rehearsal" tool, the study examines how presence in VR fulfills autonomy, competence, and relatedness needs, and how these factors affect perceived risk, destination image, and travel intention. Sixty women experienced a five-minute immersive VR tour of Rajasthan, India, followed by a questionnaire. Data analyzed through Partial Least Squares Structural Equation Modeling show that the sense of presence in VR effectively satisfies the needs for autonomy, competence, and relatedness. Autonomy satisfaction significantly reduced perceived risk, while competence and relatedness did not. Autonomy and competence satisfaction, however, enhanced destination image, which positively affected solo travel intention. The study extends SDT to VR-based tourism and offers practical insights for designing VR experiences that build women's confidence and reduce anxiety toward solo travel.

Keywords: Solo Travel, Virtual Reality, Self-Determination Theory, Perceived Risk.

1 Introduction

In recent years, female solo travel has become an emerging trend. Despite growing interest, female travelers continue to face challenges such as safety concerns, social pressure, and lack of confidence. Studies show that more than 80% of solo female travelers have felt their safety threatened [1], while traditional cultural norms often discourage women from traveling alone, viewing it as socially inappropriate [2]. Many also doubt their capabilities, which hinders their intention to travel independently, even though they desire freedom and self-growth through solo travel [3]. To address these barriers, this study uses Virtual Reality (VR) as a "mental rehearsal" tool for potential solo female travelers. VR experiences typically vary in interactivity and sensory realism, yet even low-interactivity immersive environments can produce a sense of presence. This sense of 'being there' enables users to mentally simulate unfamiliar destinations in a safe and controlled setting. Immersive VR experiences may help reduce anxiety about unfamiliar environments, enhance confidence, and satisfy basic

psychological needs such as autonomy, competence, and relatedness. Based on Self-Determination Theory (SDT), this research constructs an integrated model to examine how VR experiences influence solo travel intention among women. Specifically, the study examines whether the sense of presence in VR can fulfill psychological needs, thereby reducing perceived risk and enhancing destination image. By identifying the mechanisms through which VR enhances women's readiness for solo travel, this study contributes to both theory and practice. It extends the understanding of female solo travel motivation and provides actionable insights for the tourism industry to leverage VR technology in empowering female travelers to embark on independent journeys with greater confidence.

2 Literature Review and Theoretical Framework

2.1 Female Solo Travel

Women's motivations for solo travel are primarily driven by intrinsic "push" factors such as the pursuit of freedom and autonomy, self-challenge and competence growth, emotional healing, and self-exploration [4-6]. Studies indicate that solo travel allows women to temporarily escape everyday social roles and exercise autonomy through independent decision-making [6, 7]. By navigating unfamiliar environments and solving problems, they enhance self-efficacy and competence [8].

However, past studies show that women experience travel differently from men and from other traveler groups due to gendered social structures, safety concerns, and societal expectations [7, 9]. Safety remains the most frequently cited concern among women who travel alone. Women report disproportionate exposure to harassment, unwanted attention, and anxiety regarding personal security [7]. Beyond physical safety, solo female travelers often negotiate social expectations surrounding femininity and independence, which create additional psychological barriers such as fear of judgment or lack of social support [8]. These gender-specific challenges influence how women prepare for travel. Understanding the unique needs and constraints of solo female travelers is therefore essential for examining how psychological mechanisms operate within this group. This contextual foundation provides a rationale for applying Self-Determination Theory (SDT) to understand how autonomy, competence, and relatedness needs can be supported through VR experiences for solo female travelers.

2.2 Self-Determination Theory

Self-Determination Theory (SDT) in tourism studies explains how fulfilling autonomy, competence, and relatedness improves tourists' well-being, satisfaction, and revisit intention [10]. However, most research focuses on general or group travel, overlooking solo female travel with its unique risks and challenges. While SDT has been widely applied in tourism research, its relevance becomes particularly salient in contexts where travelers experience heightened vulnerability, uncertainty, or social constraint. Solo female travel represents one such context.

Autonomy refers to the experience of self-determination and freedom of choice in one's actions [11]. For solo female travelers, autonomy carries additional meaning because travel is often viewed as a symbolic act of independence and resistance against societal expectations that portray solo travel as unsafe or inappropriate for women [8]. In this context, technologies that enhance women's perceived control over the travel experience become particularly valuable. The high sense of presence afforded by virtual reality enables users to experience a "sense of agency," or the feeling of being in control of decisions and actions within the virtual environment [12, 13]. Therefore, we propose ***H1: Presence has a positive effect on the satisfaction of autonomy needs.***

Competence refers to an individual's sense of effectiveness and ability to handle challenges successfully [14]. Immersive simulations in VR can enhance users' self-efficacy by gradually exposing them to challenges, such as in phobia treatments or scenario rehearsals [15, 16]. Competence is especially critical for women traveling alone, who often report lower travel-related self-efficacy and greater concerns about handling unfamiliar environments, route navigation, or safety threats compared with male travelers [3, 8]. VR's ability to simulate environments, demonstrate scenarios, and provide experiential learning can strengthen women's perceived competence by offering mental rehearsal and reducing uncertainty. Therefore, we propose ***H2: Presence has a positive effect on the satisfaction of competence needs.***

Relatedness refers to an individual's desire to establish meaningful connections and a sense of belonging with others or the environment [13]. Solo female travelers frequently experience loneliness, vulnerability, or lack of social support during travel [9]. In VR, presence not only creates a realistic contextual atmosphere but can also evoke social presence through virtual characters or interactive elements [17, 18]. By providing emotional reassurance, VR helps fulfill relatedness needs by creating a sense of connection or safety before travel, thereby satisfying their need for relatedness. Therefore, we propose ***H3: Presence has a positive effect on the satisfaction of relatedness needs.***

2.3 Perceived Risk, Destination Image, and Travel Intention

Perceived travel risk refers to tourists' subjective assessment of potential harm based on its likelihood and severity, which directly influences their attitudes and behavioral intentions [19, 20]. Female solo travelers often experience greater vulnerability due to the absence of companionship, with personal safety being the most critical concern [7, 9]. They also face financial, functional, and psychosocial risks, including loneliness and social image concerns [20-22]. According to STD, satisfying autonomy and competence needs enhances women's perceived control and self-efficacy, thereby reducing anxiety about uncertainty. Similarly, fulfillment of relatedness needs (e.g., a sense of familiarity and connection with local people or environments) can alleviate apprehension toward unfamiliar contexts [23-25]. Therefore, we propose ***H4-H6: Satisfaction of autonomy, competence, and relatedness needs negatively influences perceived risk.***

Destination image reflects travelers' overall impressions of a place [26]. When women's autonomy, competence, and relatedness needs are fulfilled, they perceive destinations as safer, friendlier, easier to navigate, and emotionally engaging, enhancing

both cognitive and affective evaluations [27-29]. Therefore, ***we propose H7–H9: Satisfaction of autonomy, competence, and relatedness needs positively influences destination image.*** Past research shows a negative relationship between perceived travel risk and behavioral intention (i.e., travelers' willingness to act) [19, 30]. Destination image is also a key antecedent of behavioral intention. A positive image enhances tourists' willingness to visit and recommend [31]. For women travelers, perceiving destinations as safe, friendly, and appealing strengthens confidence and increases solo travel intention [32]. Therefore, we propose ***H10: Perceived risk negatively influences travel behavioral intention***, and ***H11: Destination image positively influences travel behavioral intention.***

3 Methodology and Results

The study involved 60 female participants aged 18 and above. Among them, approximately 60% were aged 18 to 24 (n = 36) and 30% were aged 25 to 34 (n = 18). Participants used a Xiaomi VR headset to experience a five-minute virtual tour of Rajasthan, India. The VR experience consisted of a 360-degree YouTube travel video viewed through a Google Cardboard–type headset, providing low interactivity but high-realism audiovisual immersion. The panoramic visual design and spatial audio cues were intended to enhance the sense of presence and allow participants to mentally simulate being in the destination. The video guided viewers through the "Land of Kings," showcasing majestic palaces, desert nomadic life, and distinctive cultural and architectural landscapes. India was selected as the case destination due to its rich cultural heritage and its complex, often controversial image among female travelers. After the VR experience, participants completed a structured questionnaire measuring the study's focal constructs. The items were adapted from validated scales in prior research to ensure reliability and validity [20, 25, 33-34].

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The measurement model demonstrated strong reliability and validity: all Cronbach's α values exceeded 0.70, indicating good internal consistency; Average Variance Extracted (AVE) values were above 0.50, confirming convergent validity; and Heterotrait–Monotrait (HTMT) ratios were below 0.90, supporting discriminant validity. The results of the structural model are presented in Fig. 1.

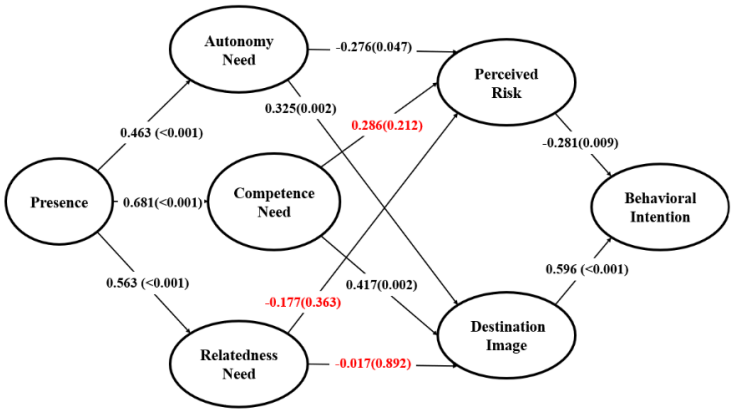

Fig. 1. Structural model result (Source: Authors' Own)

4 Discussion and Conclusion

This study examined how virtual reality experiences influence women's intentions for solo travel. Results revealed that satisfaction of autonomy needs significantly reduced perceived travel risk, whereas competence and relatedness needs did not show the same effect. This may be due to the limitations of VR content, which, while enhancing a sense of capability and interactivity, cannot fully mitigate real-world concerns such as language barriers or personal safety risks [7, 9]. Moreover, although relatedness needs were satisfied through virtual interactions, the lack of genuine social support limited their impact [18]. Conversely, satisfaction of autonomy and competence needs significantly improved destination image, which in turn strengthened solo travel intention, reaffirming the role of destination image in travel decision-making [26, 31]. The findings suggest that VR functions as an empowering tool to reduce anxiety and enhance confidence.

Theoretically, this study extends Self-Determination Theory (SDT) to the intersection of VR and solo female travel, offering new insights into the relationship between perceived risk and behavioral intention. Practically, tourism organizations can design immersive VR experiences with empowerment cues and safety information to enhance women's evaluations and travel intentions. However, the current small, age-skewed sample may limit generalizability; future studies should include a more diverse set of participants and destination contexts. Solo travel is also shaped by intersectional factors such as race, class, and disability, which warrant further exploration. Finally, our ongoing research involves more data collection that separately measures physical, social, and financial risks to provide a more comprehensive model of risk perceptions among solo female travelers.

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Beyond Sight and Sound: Multisensory Virtual Tourism

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Abstract. This study investigates how multisensory inputs influence users' sense of presence, destination image, and intention to visit in a virtual tourism context. A virtual leisure farm was created using Unity 3D and experienced through an HTC Vive Focus 3 headset. Forty-nine participants were randomly assigned to high- and low-sensory groups. The high-sensory group received additional olfactory and gustatory cues synchronized with three virtual scenes. The manipulation check results confirmed significant differences in perceived olfactory and gustatory stimulation between groups. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the findings revealed that negative effects significantly and negatively influence the sense of presence, while the sensory level positively moderates this relationship. Ecological validity positively affects presence, but the moderating effect of sensory level on this relationship was not significant. This research advances theoretical understanding of multisensory VR tourism experiences and offers practical insights for designing immersive, resilient, and engaging virtual destination marketing applications.

Keywords: Virtual Reality, Multisensory, Ecological Validity, Negative Effects.

1 Introduction

Virtual Reality (VR) is a computer technology that replicates an environment (real or imagined) and simulates a user's physical presence in that environment to enable user interaction. VR technology initially focused on sight and sound, providing immersive visual landscapes complemented by directional and ambient soundscapes. However, a tourism experience is, in essence, a multisensory experience involving sight, sound, smell, taste, and touch [1]. By stimulating multiple senses simultaneously, multisensory VR creates a deeply immersive environment that far surpasses the impact of conventional marketing tools, which typically engage only one or two senses [2-4]. While several previous studies' efforts have incorporated different sensory experiences into virtual environments, including visual cues [5], olfactory cues [3], auditory and taste cues [6], and haptic experiences [7, 8], there is still a lack of studies analyzing the integration of human senses (smell, taste, and touch) into VR experience and their impact on des-

tination marketing [6, 9]. Specifically, empirical studies that integrate gustatory experiences into VR tourism remain scarce, despite their relevance to food, beverage, and agricultural attractions. Furthermore, while prior research often examines the overall benefits of multisensory VR, few studies investigate how different sensory modalities jointly shape the cognitive and affective components of destination image within a theoretically grounded framework. Finally, few studies focus on the negative effects of VR, such as discomfort or dizziness. To address these gaps, this study is designed to incorporate the multiple senses in virtual reality and empirically evaluate a research model to advance the theoretical understandings of the effect of multiple sensory cues in VR tourism.

2 Literature Review and Theoretical Framework

By creating a sense of presence in the virtual environment, VR allows prospective visitors to pre-sample the tourism destination [10]. Past studies comparing VR to other media (e.g., video, websites) have proven that VR is an effective destination marketing tool [11]. The evolving field of digital marketing increasingly acknowledges the importance of a multisensory approach, especially in the hospitality and tourism industry [12].

2.1 Ecological Validity and Presence

Presence is "the sense of being in an environment" [13]. In a virtual environment, users experience a sense of presence when fully immersed in a computer-mediated environment [14]. Ecological validity is the extent to which a virtual environment mirrors the real world [15]. Studies indicate that the sense of presence within a virtual environment tends to increase with the fidelity of its replication or simulation of the physical world [16]. The replication and simulation of the real world include visual cues (e.g., shadows, textures, or self-representation) and behavioral cues (e.g., social cues, object responses to manipulation) [22, 23]. The closer these cues in a virtual environment are to mimicking real-world experiences, the greater the sense of presence will likely be [17]. Therefore, we propose *H1: Ecological validity positively influences the sense of presence.*

2.2 Negative Effects and Presence

Negative effects refer to the adverse symptoms and side effects that users may experience during or after the VR experience, such as nausea, dizziness, disorientation, and headaches [16, 18]. Past research has hypothesized that the negative effects of VR diminish the sense of presence [19, 20]. This discomfort in VR reduces users' focus, making it hard to feel "in" a virtual world when their attention is consumed by physical discomfort or the urge to end the session [21, 22]. Therefore, we propose *H2: Negative effects negatively influence the sense of presence.*

2.3 The Moderating Effects of Multiple Senses

Due to the multisensory nature of the tourism experience, customers do not independently perceive sensory cues [23]. The incorporation of multiple sensory cues offers customers multisensory experiences that mirror real-life situations, further enhancing their sense of presence through a natural, immersive, and engaging VR experience [24]. On the other hand, a richly multisensory VR environment is expected to buffer the detrimental impact of negative effects on presence, as a highly immersive virtual environment makes users more resilient to disruptions caused by discomfort [20, 25]. Therefore, we propose *H3: The effect of ecological validity on sense of presence is stronger under higher sensory inputs than under lower sensory inputs*; and *H4: The negative effect of negative effects on sense of presence is weaker under higher sensory inputs than under lower sensory inputs.*

2.4 Destination Images and Travel Intention

The sense of presence enhances customers' level of involvement, leading them to exert greater cognitive effort in decision-making, which in turn affects their beliefs or knowledge about a destination's attributes (i.e., the cognitive destination image) [26]. Having a sense of presence through virtual reality also triggers emotional responses more effectively, thereby fostering a more impactful affective image [27]. The cognitive and affective images together create the actual travel decision [28]. Therefore, we propose H5 and H6: The sense of presence positively influences cognitive/affective destination image; and *H7 and H8: The cognitive/affective destination image positively influences the intention to visit.*

3 Methodology and Results

This study employed an experimental research design. Participants experienced a virtual leisure farm created using Unity 3D, which was modeled on an actual leisure farm in Taiwan, and delivered through the HTC Vive Focus 3 with controllers. A total of 49 participants were recruited and randomly assigned to one of two conditions designed to manipulate sensory richness [4, 29], operationalized through the presence or absence of olfactory and gustatory cues. Both groups experienced the same three virtual scenarios in the leisure farm: (1) Tea preparation in a guestroom, (2) Sky lantern release in a forest, and (3) Fruit picking in an orchard. The high-sensory group (n = 24) received multisensory stimulation that included visual, auditory, olfactory, and gustatory cues. In the first scenario, while participants virtually prepared tea, the researchers simultaneously provided green tea essential oil for olfactory stimulation and served a cup of real green tea (brewed in advance by the researchers). In the second scenario, a forest-scented aroma was provided throughout the scene to provide olfactory stimulation. In the third scenario, participants were exposed to sweet orange essential oil during a virtual orange-picking session. The participants in the low-sensory group (n = 25) experienced only visual and auditory inputs with no additional olfactory or gustatory cues.

After the VR experience, participants were asked to complete a survey. The survey measures were adapted from validated scales.

To verify the effectiveness of the sensory-level manipulation, participants were asked to rate their perceived sensory inputs (visual, olfactory, and gustatory) after the VR experience. Independent-samples t-tests were conducted to compare responses between the high-sensory and low-sensory groups. Results indicated significant differences in participants' perceptions of olfactory and gustatory stimulation, confirming that the high-sensory group experienced higher sensory intensity. In contrast, the visual input did not differ significantly between groups, suggesting that both groups perceived comparable levels of visual immersion. Following the manipulation check, Partial Least Squares Structural Equation Modeling (PLS-SEM) was performed using SmartPLS 4.0 to test the hypothesized relationships among constructs. The measurement model was evaluated to ensure the reliability and validity of the latent constructs. The results confirmed satisfactory convergent validity, reliability, and discriminant validity. The results of the structural model are presented in Fig.1. The R^2 for intention to visit is 0.518, indicating a moderate level of explanatory power.

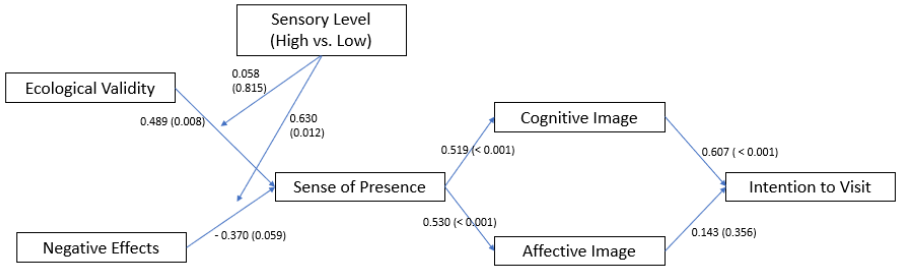

Fig. 1. Structural model result (Source: Authors' Own).

4 Discussion and Conclusion

Consistent with prior studies, negative effects were found to significantly reduce the sense of presence. Importantly, the moderating effect of sensory level on the relationship between negative effects and presence was significant. This result suggests that multisensory stimulation can buffer the detrimental impact of negative effects. When smell and taste cues were added, users seemed more able to remain engaged despite mild discomfort. This aligns with sensory marketing theory, which argues that multisensory inputs strengthen attention focus and deepen mental imagery [29], thereby helping users maintain a coherent experiential flow even in the presence of physical distractions. However, the moderating effect of sensory level on the relationship between ecological validity and presence was not significant. One possible explanation is that users cognitively prioritized visual realism over other senses when evaluating environmental authenticity, consistent with tourism experience theories emphasizing visual dominance in destination perception [30]. Thus, olfactory and gustatory cues, while

enhancing immersion, may not substantially alter users' assessments of realism when visual fidelity is already high. Finally, our findings also suggest that cognitive image has a stronger effect on intention than affective image. This could relate to cognitive load. The majority of our participants (81.63%) reported limited knowledge of virtual reality; as such, they needed to allocate more cognitive resources to understanding navigation and interactions in the virtual environment. This cognitive effort may have suppressed affective responses despite the presence of multisensory cues. A past study also found that cognitive image is a stronger predictor of visit intention than affective image, especially when tourists are not familiar with the destination, leading them to base their destination choice on rational evaluation [31].

This study contributes to the growing literature on multisensory virtual reality in tourism by integrating ecological validity, negative effects, and sensory input levels into a unified framework explaining presence and image formation. For practitioners, the findings underscore the importance of multisensory design in tourism-oriented VR applications. Incorporating controlled olfactory and gustatory elements can enhance users' tolerance for mild physical discomfort and maintain engagement. As this working paper represents a pilot experiment with a small sample, the study serves as an initial test of both the sensory-level manipulation and the proposed model. Future research should expand the sample size to improve predictive power and incorporate additional sensory inputs (e.g., haptic, thermal, or wind simulation) to further clarify the cumulative effects of multisensory integration.

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Dancing Beyond Barriers: Exploring Haptic Dance Floors as Inclusive Technologies in Event Experiences

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Abstract. This paper explores how haptic (vibrotactile) technologies can foster inclusion in tourism and event experiences. Moving beyond barrier-removal approaches, it reframes accessibility as equitable, co-present participation enabled through sensory diversity. Haptic systems—such as vibrotactile dance floors, wearable vibrotextiles, and seated or backpack devices—translate musical information into tactile form, allowing Deaf and hearing audiences to share embodied, time-locked engagement. Grounded in multisensory experience theory, inclusive tourism research, and evidence from audio-tactile studies, the paper introduces an Inclusive Sensory Experience (ISE) Framework positioning haptics as a core design variable. A qualitative, comparative multiple-case study in the UK and US examines how such systems are deployed, under what conditions they enhance inclusion, and what challenges emerge. Expected outcomes include a terminology map, venue-ready playbooks for practice, and policy insights linking haptic innovation to measurable inclusion in events and tourism.

Keywords: Haptic Technology, Inclusive Events, Experience Design.

1 Introduction

Tourism and events are increasingly shaped by the intersection of digital technologies and inclusion agendas. Within this landscape, multisensory design has become essential for both enriching engagement and supporting equitable participation. While experience-economy research highlights the role of orchestrated sensory cues, contemporary accessibility scholarship reframes inclusion as cultural belonging rather than barrier removal [1]. In this view, sensory design is a foundational element of inclusion, not an auxiliary accommodation [2, 3].

The scale of need underscores the urgency of inclusive sensory design. Globally, over 430 million people require rehabilitation for disabling hearing loss, rising to an estimated 700 million by 2050 [4]. In the UK, more than 18 million adults are Deaf or have hearing loss [5], and in the US around 30 million people aged 12+ experience bilateral hearing loss [6]. Despite these figures, substantial access barriers persist across cultural and leisure settings.

Against this backdrop, haptic (vibrotactile) music technologies offer a salient test case for inclusive sensory design. By transducing acoustic energy into patterned vibration delivered to the skin or skeleton, such systems render musical structure tactilely perceivable [13, 14, 15]. Importantly, the viability of this translation is not only intuitive; it has been demonstrated empirically. Laboratory work shows that both Deaf and hearing participants can synchronize whole-body movement (e.g., bouncing) to vibrotactile electronic dance music presented through a vibrating platform, indicating that temporal information can be conveyed effectively through touch alone [7, 8]. Complementary research with cochlear-implant (CI) users indicates that adding vibrotactile stimulation can improve music-related perception and engagement relative to auditory-only exposure, while also clarifying boundary conditions (e.g., individual preference heterogeneity, timbre cues) [9, 10, 11, 12].

While the extant evidence base remains modest, these findings support treating haptic systems as access technologies with potential to enable co-present, time-locked participation for Deaf and hearing audiences alike. Industry developments have begun to translate this promise into deployable solutions across distinct modalities. Floor-based platforms such as Feel the Beat implement modular, bone-conduction vibrotactile dance floors designed for studios and portable event installations [14, 15]; wearable systems such as Music: Not Impossible distribute musical features across multi-channel vibrotactile arrays on the body [13]; seated/backpack devices such as SubPac deliver low-frequency tactile bass that augments listening in clubs, production studios and VR settings [16]. Although diffusion remains niche relative to mainstream sound reinforcement, these platforms establish a practical design space—floor, wearable, and seated—within which venues, festivals and cultural institutions can experiment with inclusive configurations and evaluate operational constraints (e.g., cost, safety, latency, maintenance and standardization) [13, 15].

Responsible-innovation and human-centred design considerations necessarily shape deployment. Haptic systems introduce governance questions around safety (e.g., vibration exposure, trip hazards), privacy and hygiene (shared wearables), inclusion ethics (avoiding tokenism), interoperability with assistive listening, staff/artist training, and venue-specific constraints (room geometry, crowd density, risk management) [1–3]. Geography and policy environments also matter: the UK's cultural institutions often operate within frameworks that foreground accessibility and public value, facilitating pilot deployments; in the US, a more market-driven innovation ecology has supported social-enterprise and start-up activity in haptic music, yielding portable products and event partnerships but heterogeneous standards and practices [13–16]. Industry exemplars (Feel the Beat, Music: Not Impossible, SubPac) provide concrete cases for examining adoption, audience impact, and operational feasibility [13–16].

Taken together, the conceptual, empirical, and practical strands motivate treating haptic event systems as more than novel add-ons. In this paper we consolidate a terminology map for haptic music technologies in event contexts; situate these technologies within the triad of floor-based, wearable, and seated/backpack modalities; and connect them to accessibility objectives framed as shared rather than segregated experiences [7, 8]. We also situate the problem within the demographic realities of hearing loss to jus-

tify potential scale of impact [4]. The primary aim of this study is to propose and articulate an Inclusive Sensory Experience (ISE) Framework that integrates multi-sensory experience theory, accessibility and inclusion principles, and responsible-innovation concerns; to clarify overlapping terminology and technology modalities; and to outline a comparative UK–US context and research agenda for evaluating how haptic event technologies can advance equity without compromising artistic integrity, cultural authenticity, or human connection.

2 Preliminary Literature Review

Research on multi-sensory experience provides a first pillar for theorizing inclusive event design. Schmitt's experiential marketing framework conceptualizes how sensory, affective, cognitive, behavioral and relational modules can be orchestrated to create memorable value, positioning touch as a legitimate design channel alongside vision and audition [17]. Building on this lens, the present study treats haptics not as an embellishment but as a functional modality through which core musical information—tempo, dynamics, phrasing—can be rendered accessible and co-experienced.

A second pillar derives from accessible and inclusive tourism scholarship, which has progressively shifted from a deficit-based barrier-removal logic toward socially grounded models emphasizing equitable participation, dignity, and cultural belonging. Empirical and conceptual work shows that inclusion requires re-imagining products and environments, not merely adding accommodations; it further highlights embodiment and co-presence as critical to experience quality for disabled tourists [18, 19, 20, 21]. Within this tradition, haptic systems can be theorized as participatory interfaces that enable shared, synchronous engagement between Deaf/Hard-of-Hearing (DHH) and hearing audiences, thus aligning inclusive design goals with experience-centric value creation.

A third pillar comes from haptic music and audio-tactile perception studies, which provide direct evidence that temporal structure can be communicated through the skin. Tranchant et al. demonstrated that both Deaf and hearing participants could synchronize whole-body movement (bouncing) to vibrotactile electronic dance music delivered via a vibrating platform, indicating that touch alone can support beat-tracking behavior [22, 23]. With cochlear-implant (CI) users, converging findings show that adding vibrotactile stimulation can enhance aspects of music perception or engagement relative to auditory-only listening—while also revealing heterogeneity in user preferences and boundary conditions (e.g., timbre cues, intensity mapping) [8–10]. Related electro-/audio-haptic work evidence perceptual and communicative benefits of vibrotactile cues in challenging listening scenarios [24]. Together, these studies justify treating haptic channels as access technologies with experiential potency, thereby connecting the experiential-marketing and inclusive-tourism pillars to a psychophysical substrate.

Synthesizing these strands, we conceptualize haptic event systems (floor-based, wearable, and seated/backpack modalities) as co-sensory infrastructures that (i) translate core musical features into vibrotactile patterns, (ii) afford time-locked participation

that can bridge DHH and hearing audiences, and (iii) support inclusive value co-creation at scale. From a theoretical standpoint, this implies three propositions for subsequent empirical work:

1. Multisensory orchestration that explicitly integrates tactile cues should increase perceived inclusivity and collective engagement relative to audio-visual baselines [20].
2. When vibrotactile mapping is information-bearing (e.g., beat-salient, frequency-differentiated), DHH and hearing participants will exhibit improved temporal coupling and affective resonance [23].
3. Inclusive outcomes will be contingent on human-centred calibration (intensity, safety, hygiene, training) and on contextual affordances (venue geometry, density), suggesting that adoption must be studied as a joint function of user experience and organizational decision-making stitched to inclusion mandates [24].

This integrated framework positions haptics as a core design variable in inclusive event experiences: it fuses multisensory experience theory with inclusive tourism principles and underwrites them with audio-tactile evidence, laying the foundation for the proposed Inclusive Sensory Experience approach and a comparative UK–US research agenda. Current tourism-experience research increasingly recognises that experiences are inherently multisensory, yet tactile modalities remain significantly under-theorised. Existing frameworks prioritise visual and auditory stimuli, leaving limited understanding of how vibrotactile cues shape emotional engagement, embodiment, and social inclusion. This study extends multisensory tourism theory by positioning haptic technologies as a distinct sensory channel capable of enabling co-experience for visitors who cannot rely on sound. Through qualitative interviews and naturalistic observation, the research will generate evidence of how haptic systems influence affective responses, perceived accessibility, and the overall meaning-making process, thereby filling an important gap in inclusive tourism scholarship.

3 Methodology

This study is designed as a qualitative, mono-method comparative multiple-case study to explicate how haptic (vibrotactile) systems are deployed in event contexts, under what conditions they strengthen inclusive experience, and what barriers emerge, using the United Kingdom and the United States as comparative settings. The United Kingdom and the United States were selected as comparative settings for two reasons: (1) both countries have internationally visible live-events industries with early experimentation in haptic and multisensory accessibility technologies, and (2) their differing regulatory and policy approaches to accessibility (e.g., the UK Equality Act 2010 vs. the US ADA framework) offer a theoretically meaningful basis for examining how contextual factors shape the adoption and operationalization of haptic systems. In each case,

3–4 stakeholders (management/operations, technical staff, accessibility/audience-experience leads, and where possible an artist/DJ) will be interviewed using semi-structured protocols (total ≈12–16 interviews); where schedules permit, brief naturalistic observation will be conducted and documents/artifacts (installation/procedure notes, training materials, risk/hygiene documentation) will be reviewed. Data will be analyzed via framework-informed thematic analysis, followed by cross-case synthesis and pattern matching to relate findings to the expectations of the Inclusive Sensory Experience framework. Given its qualitative nature and limited number of cases, the study makes no claim to statistical generalizability; rather, it seeks to generate operational and design insights that can seed hypotheses for subsequent quantitative tests. The research will be conducted in accordance with institutional ethical approval and informed-consent procedures.

4 Potential Outcomes of the Study

By the end of this study, key terms will be clarified in ways that strengthen the conceptual base of tourism-experience and multisensory-experience research. A concise terminology map will define and distinguish "haptic, vibrotactile, tactile sound, vibroacoustic," and the main deployment modes (floor, wearable, seated), addressing the current absence of precise tactile terminology in tourism studies.

The study will also provide qualitative evidence of how haptic systems enhance tourism and cultural-event experiences for Deaf and hard-of-hearing visitors. Through interviews and brief naturalistic observations, we will capture how participants describe emotional engagement, embodiment, co-experience with companions, and perceived inclusion. For each case, we will document how the technology was installed, integrated into the visitor journey, and supported by staff and artists. These insights will inform short, venue-ready playbooks outlining where haptic floors, wearables, or seated solutions have the greatest experiential impact and how to communicate these options clearly to guests.

Finally, the comparison between the United Kingdom and the United States will illustrate how differing policy and market environments shape the scaling of inclusive multisensory design. The study will conclude with practical design principles linking specific technological choices to measurable improvements in accessibility and visitor experience.

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Demographics, Policy & Specialized Tourism Markets

Beyond Age: Unpacking Chinese Seniors' Travel Dining Motivations through a Socioemotional Selectivity Lens

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Abstract. This study adopts a socioemotional selectivity theory (SST) lens to explore Chinese seniors' travel dining motivations and the influence of socio-demographic factors, including cultural background, gender, and health issues. Based on in-depth interviews, four dimensions of motivations were identified: health-related, emotionally meaningful, expansive, and others. Within these, seven domains emerged, spanning health and safety, familiarity, emotional experiences, social connectedness, novelty seeking, cost-efficiency, and online influence. Further segmentation revealed four senior subgroups shaped by gender and health-related dietary restrictions, each with distinct yet occasionally overlapping motivations. The findings extend SST by integrating socio-demographic and contextual factors, offering a more nuanced understanding of motivational dynamics in later life. They also enrich tourism and restaurant literature by addressing the underexplored dining needs of Chinese senior tourists. Practically, the study provides actionable insights for tourism and hospitality stakeholders in mainland China to design more inclusive dining experiences for this growing market segment, as many seniors remain at risk of digital exclusion.

Keywords: Chinese seniors, travel dining, socioemotional selectivity theory, senior tourism, senior dining motivations.

1 Introduction

Senior tourism represents one of the fastest-growing global markets, particularly in China, where the aging population is expanding rapidly. By 2040, individuals aged 60 and above will comprise approximately 28% of China's population [28]. With a relatively low retirement age (50 years prior to 2025), Chinese seniors now possess greater leisure time and increasingly engage in tourism activities. They already account for about one-fifth of China's total tourist population [19], a proportion expected to rise substantially. Moreover, their financial stability and purchasing power make them a critical consumer segment for tourism and hospitality industries [27]. However, despite their potential, Chinese seniors' actual travel expenditures often fall below expectations [21], and market offerings remain relatively homogeneous [25], revealing a persistent mismatch between supply and the diverse, evolving needs of older tourists.

Travel dining is a vital component of tourism, accounting for a substantial proportion of tourist expenditures [14], [26]. Higher satisfaction with food consumption not only increases tourist spending [7] but also strengthens destination competitiveness, profitability [6], and reputation [14]. For senior tourists, local food is equally important, serving as both sustenance and sometimes a source of travel motivation [10]—a dynamic particularly salient in China, where food contributes to happy ageing [2]. Yet senior tourists may face unique challenges when dining out, including adverse health conditions (e.g., diabetes, hypertension), declining sensory abilities (e.g., taste), concerns about medical issues, and the stress of unfamiliar environments [9], [25], [27], which shape dining needs that differ from other groups. Despite these distinctions, research on seniors' travel dining needs remains scarce in both tourism [2] and restaurant contexts [12].

Understanding seniors' dining motivations is thus critical for predicting travel dining behavior [17]. As Hsu et al. noted, studying motivation in Chinese senior tourism is part of broader efforts to influence seniors' behaviors and enhance their quality of life through leisure travel [10]. Prior studies have largely compared seniors to younger groups, focusing on age-related differences. For instance, Kim and Jang found that perceptions of healthiness strongly influence seniors' restaurant choices compared to younger diners [12]. However, this age-centric approach risks oversimplifying senior motivations by neglecting socio-demographic variations—such as gender, cultural background, and health status—that may shape Chinese seniors' travel dining decisions [21].

Unlike age-centric perspectives, Socioemotional Selectivity Theory (SST) offers an alternative lens, suggesting that as future time perspective diminishes with age, individuals prioritize emotionally meaningful motivations over expansive ones (e.g., acquiring novel information) [5]. SST has been used to explain older adults' motivations across various domains (e.g., volunteering; leisure) and has inspired its application in tourism and hospitality to explore senior tourists' travel motivations [24]. But findings are mixed. Several studies have shown that senior tourists prioritize emotionally meaningful and positively valanced experiences to enhance well-being [13], consistent with SST's propositions. However, SST primarily addresses psychological mechanisms to the neglect of social, cultural, economic, and health-related impacts [18]. For instance, gender differences shape emotional outcomes: older women find wellness tourism more fulfilling than men do [1]. These aspects do not negate SST's motivational slant but can modulate its strength.

Conversely, other research has challenged SST's utility in tourism. Wealthy Turkish senior tourists often favor practical motivations over emotional ones [4], implying that economic status and cultural background are influential. Cultural values are particularly pertinent in China: a national long-term orientation fosters future-oriented decisions, and many Chinese seniors perceive tourism as wasteful, preferring to save for aging-related needs [10]. These examples highlight while SST provides a useful framework for examining older adults' travel motivations, how cultural and socioeconomic contexts influence motivations in ways that SST alone cannot fully account for.

Given these gaps, this study builds on SST to explore Chinese senior tourists' dining motivations from a more multidimensional perspective by integrating cultural background, gender, health status, and socioeconomic status, moving beyond a narrow focus on age differences. This study therefore aims to 1) explore the travel dining motivations and underlying dimensions of Chinese senior tourists; 2) identify Chinese senior tourists' preferred restaurant attributes for each motivation; and 3) unravel the relationship between Chinese seniors' socio-demographic variables and travel dining motivations. Empirically, it provides a systematic investigation of Chinese seniors' travel dining motivations, addressing a critical gap in both tourism and restaurant research. Theoretically, it extends the application of SST by incorporating contextual factors together with factors such as gender and health status, offering a more comprehensive framework for understanding senior tourists' dining motivations. Practically, the findings equip tourism and hospitality providers with actionable insights to design more personalized and inclusive dining experiences for this growing market segment.

2 Methodology

Fifty-one semi-structured interviews were conducted using purposive sampling to explore Chinese seniors' travel dining experiences and the motivations underlying their restaurant and food choices (see Figure 1 for demographic information). This qualitative approach responds to Balderas-Cejudo et al.'s call for more qualitative research on older tourists [2], providing insights that extend beyond the reach of quantitative methods. As Sedgley et al. argue, qualitative interviews are particularly valuable when respondents' voices must be heard [23]; in line with Wu and Lin's suggestion, this study foregrounds senior diners' perspectives to narrow the gap between supply and demand in the senior dining market [29].

Interviewees were informed about the study's purpose and assured of confidentiality at interviews' outset. They were asked to reflect on their travel dining experiences over the past two years, including dining motivations. Key prompts included "Why do you choose that restaurant?" All interviews were digitally recorded with interviewees' informed consent. Data collection ceased once theoretical saturation was reached (i.e., no new themes emerged from the conversations).

The interviews were transcribed verbatim and analyzed in NVivo 15. The interviewer employed probing, paraphrasing, and summarizing during conversations to enhance data accuracy and minimize ambiguity. Coding followed an iterative process, whereby text segments were grouped under emerging codes. Major themes and subthemes were refined, contrasted, and situated within the literature via constant comparison. Rigor was ensured through independent coding: the authors reviewed the data until convergence was achieved, at which point no novel insights were identified.

Characteristic	Frequency	Percentage
Gender		
Female	33	65%
Male	18	35%
Age		
50–54	10	19.6%
55–59	7	13.7%
60–64	17	33.3%
≥ 65	17	33.3%
Health issue(s)		
Diabetes	13	25.5%
Food allergies	6	11.8%
Hypertension	7	13.7%
Other	7	13.7%
None	23	45.1%
Travel companions		
Family members	33	64.7%
Close friends	19	37.3%
Other friends	5	9.8%
None	5	9.8%

Notes. Five interviewees reported multiple health issues that restricted their dietary options; other conditions included metabolic arthritis and hyperlipidemia (e.g., high cholesterol). Eleven interviewees reported occasionally traveling with family or best friends. "Close friends" included long-term friends; "other friends" included former coworkers, acquaintances with similar interests, and old comrades.

Fig. 6. Interviewee' Demographic Information
Source: Authors' own

3 Results and Discussion

This exploratory study identifies four primary dimensions and seven subsets of Chinese seniors' travel dining motivations (Figure 2), with definitions provided in Figure 3. Driven by these motivations, seniors value different restaurant attributes as detailed in Figure 4 (*units* refer to the number of times interviewees mentioned a specific theme).

However, these motivations are not equally perceived by all Chinese seniors. Gender and health-related dietary restrictions emerged as the two most critical criteria for segmentation, leading to the identification of four distinct yet occasionally overlapping motivational groups (see Figure 5). Notably, online influence is salient only for females with dietary restrictions. It challenges the long-held perception that senior tourists are less adept at adopting technology [9], particularly among Chinese female seniors, who have traditionally regarded access to online information as a barrier [8]. While female seniors' strong health orientation makes their caution unsurprising, their reliance on social media as a negotiation tool for leveraging food safety and novelty is more unexpected. Online information—menus, images, and user reviews—offers tailored insights that better align with dietary restrictions than traditional word-of-mouth from acquaintances who often lack comparable health concern. This access not only enhances confidence in exploring novel foods but also minimizes health-related risks.

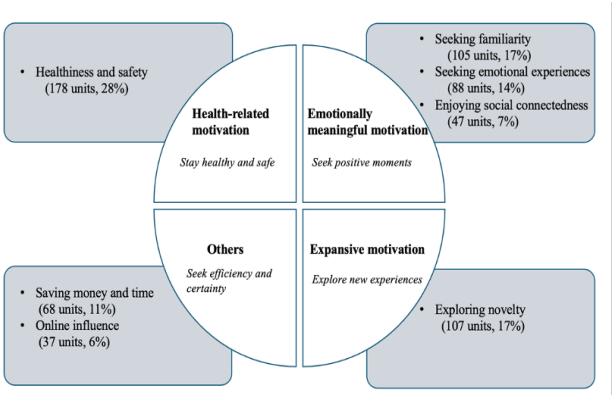

Fig. 7. Chinese Seniors' Travel Dining Motivations
Source: Authors' own

Motivations	Sub-motivations	Definition	Illustrative Quote
Health-related motivation	Healthiness and safety	Concerns about hygienic environments; high-quality ingredients; and healthy, light, easily consumable food options	*"A hygienic dining environment is essential. As digestive issues are common at our age, we prioritize safe, healthy food—especially while traveling, as getting sick can be dreadful."* (Interviewee #21)
Emotionally meaningful motivation	Seeking familiarity	Preferring habitual cuisines, familiar flavors, and comfortable dining settings	*"If I'm unsure about a dish's ingredients, I avoid it and choose familiar options to prevent stomach issues, rashes, or diarrhea, which could ruin my entire trip."* (Interviewee #38) *"Dining in a familiar restaurant eliminates the feeling of being in an unfamiliar place; instead, it feels as though you are eating in a place you once knew, offering a sense of warmth and comfort."* (Interviewee #23)
	Seeking emotional experiences	Pursuing dining experiences that provide comfort, enjoyment, and positive emotions	*"In local restaurants, the servers could take the initiative to chat with us in a close and personal manner. When they are not too busy, we can exchange a few more words, making these interactions and experiences feel particularly warm and friendly."* (Interviewee #40) *"After a tiring day of traveling, dining becomes a form of relaxation—a way to unwind and enjoy. Therefore, I highly value a sense of being warmly welcomed, like feeling at home."* (Interviewee #22)
	Enjoying social connectedness	Valuing bonding with family and friends	*"When going out with family, I may sometimes eat less if the food does not fully suit my diabetes, but we still dine together—the most important thing is that our family enjoys the meal."* (Interviewee #39) *"There should be a wide variety of dishes to accommodate everyone's preferences. In a group, people have different tastes, so only by catering to these varied preferences can everyone truly enjoy the meal."* (Interviewee #21)
Expansive motivation	Exploring novelty	Seeking local cuisines, unique flavors, and unfamiliar dining settings	*"We always want to try the local specialties. Whatever dishes are famous here, we like to taste them because we are quite interested. Food is closely connected with the local history and culture."* (Interviewee #14) *"I'll try some local foods because I haven't been able to travel in the past due to family and work. Now that I finally have the chance, I want to experience as much as possible."* (Interviewee #41)
Other motivations	Saving time and money	Preferring affordable, convenient meals	*"My first consideration is that the restaurant should be close to where I am staying since I do not want to spend too much time searching for places to eat during the trip."* (Interviewee #33)
	Online influence	Checking social media beforehand to ensure safe and satisfying dining	*"We searched online in advance for information on hygiene, ingredient sources, and other people's reviews."* (Interviewee #11) *"We looked up restaurants on Rednote in advance, checked their reviews, and also considered the taste of the dishes—nothing too strongly flavored."* (Interviewee #21)

Fig. 8. Definitions and Illustrative Quotes for Each Motivation
Source: Authors' own

Motivations	Sub-motivations	Needs
Health-related motivation	Healthiness and safety (178 units, 28%)	• Hygienic dining environment (50 units, 28%) • High-quality ingredients (49 units, 28%) • Healthy food options (35 units, 20%) • Light flavors (25 units, 14%) • Smaller portions (10 units, 6%) • Soft and warm food options (9 units, 5%)
Emotionally meaningful motivation	Seeking familiarity (105 units, 17%)	• Habitual flavors (50 units, 48%) • Common ingredients (34 units, 32%) • Familiar restaurant types (13 units, 12%) • Familiar cooking methods (8 units, 8%)
	Seeking emotional experiences (88 units, 14%)	• Friendly service (29 units, 33%) • Appealing food presentation (22 units, 25%) • A relaxed dining atmosphere (19 units, 22%) • Fine-dining establishments (18 units, 20%)
	Enjoying social connectedness (47 units, 7%)	• Companions' satisfaction (27 units, 57%) • Food variety (20 units, 43%)
Expansive motivation	Exploring novelty (107 units, 17%)	• Local specialty (58 units, 54%) • Local popularity (20 units, 19%) • Local ingredients (10 units, 9%) • Servers' recommendation (10 units, 9%) • Local-style décor (9 units, 8%)
Others	Saving time and money (68 units, 11%)	• Price (42 units, 62%) • Location (17 units, 25%) • Serving time (9 units, 13%)
	Online influence (37 units, 6%)	• User-generated content (i.e., ratings and reviews) (17 units, 46%) • Brand reputation online (12 units, 32%) • Influencers' picks (8 units, 22%)

Fig. 9. Dining Motiations and Needed Restaurant Attributes
Source: Authors' own

Motivations	Sub-motivations	Group 1	Group 2	Group 3	Group 4
Gender		Female	Female	Male	Male
Dietary Restrictions		Yes	No	Yes	No
Health-related motivation	Healthiness and safety	High (12%)	High (17%)	High (15%)	High (14%)
Expansive motivation	Exploring novelty	High (10%)	High (10%)	Low (2%)	High (10%)
Emotionally meaningful motivation	Seeking familiarity	Low (7%)	Low (5%)	High (21%)	Low (5%)
	Seeking emotional experiences	High (9%)	High (8%)	Low (1%)	Low (6%)
	Enjoying social connectedness	High (9%)	Low (0%)	Low (1%)	Low (0%)
Others	Saving time and money	Low (2%)	Low (3%)	High (10%)	High (13%)
	Online influence	High (8%)	Low (0%)	Low (0%)	Low (0%)

Note: High refers to cases where around 10% or more of units mention this motivation, while low indicates significantly less than 10%; 0% indicates that only 1 to 3 units are mentioned.

Fig. 10. Motivations among Four Groups
Source: Authors' own

4 Future Directions

There are several limitations to this study. First, the sample is drawn from a single cultural background and is predominantly female. Therefore, the findings should be interpreted with caution and not generalized to the broader population of elderly Chinese adults. Future research should seek more diverse samples to validate these results. Second, the study employs a qualitative approach to explore Chinese senior tourists' dining

needs, which, by nature, is subjective and not generalizable. Building on these findings, subsequent studies could examine the relationships among motivations, perceived risks, negotiation strategies, and cognitive as well as affective outcomes, while recruiting participants from different regions, given the substantial disparities in regional development across China. It would also be worthwhile to investigate the influence of place of residence on senior tourists' dining behaviors. Third, this study found evidence of online influence on Chinese seniors in the travel dining context. Based on this finding, future research could explore Chinese seniors' technology adoption in travel contexts and their inclusion in smart tourism initiatives.

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Global Mobility of Digital Nomads: Drivers and Visa Policy Effectiveness

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Abstract. This study examines global mobility patterns of digital nomads and the impact of visa policies on international flows. Using large-scale data from Reddit's digital nomad forum processed through large language models, we construct a geotagged dataset integrated with country-level economic, environmental, social, and institutional indicators. Gravity model reveals that cultural similarity, lower costs of living in destinations, and healthcare condition are primary mobility drivers. An advanced regression model was conducted to investigate the interaction between distance variables and the existence digital nomad visa. The research provides new empirical evidence on how country-level determinants attract remote working travelers, especially within the introduction of digital nomad visa.

Keywords: digital nomad, global mobility, visa policy, gravity model, reddit

1 Background and Research Questions

Digital nomads refer to individuals who combine travel and remote work, living a lifestyle that blends mobility with professional flexibility [1]. Following the COVID-19 pandemic, this lifestyle has become overwhelmingly prevalent worldwide, as remote work arrangements have normalized and expanded [2]. The number of digital nomad worldwide has reportedly reached over 40 million in 2024, an increase of 147% compared to 2019 [3]. Digital noamds are commonly embedded in the tourism and service industry of the destination [3], becoming an important component that cannot be ignored in tourism research and destination governance [4]. In response, a notable number of countries have introduced digital nomad visas or remote work-specific visa programs to attract and regularize this growing mobile workforce [5].

In term of international mobility, the concept of "distance" is often used to describe the differences in factors influencing the flow of population between regions. Existing research identifies four key dimensions of distances that influence digital nomad destination choices. First, economic distance strongly determine mobility patterns. As geographic arbitrage constitutes a core element of digital nomadism [6], affordable accommodation and favorable living prices consistently emerge as decisive factors in destination selection [7,8]. Secondly, familiarity enhances perceived comfort and integration ease, as nomads gravitate toward destinations with engaging cultural identities,

social acceptance, and accessible language environments [7,8]. Third, environmental distance matter significantly: nomads prefer destinations offering pleasant weather, natural beauty [9], and high quality of life supporting remote work productivity [7]. Finally, institutional distance factors-especially passport strength and visa accessibility-critically shape mobility. Stronger passports enable greater travel freedom [10], while simplified or specialized digital nomad visas signal destination openness to mobile professionals [7]. As Mancinelli argues, digital nomad visas exemplify mobility governance, distinguishing "desirable" from "undesirable" mobile subjects [11]. These regimes function as both economic development strategies and biopolitical tools: selectively inviting cosmopolitan, economically independent professionals while maintaining control over less compatible mobility forms.

Despite these insights, two critical gaps remain. First, current research on digital nomads is predominantly based on small-scale case studies, often relying on interviews with a limited number of participants or focusing on specific destinations. Compared with large-sample quantitative analyses, such studies suffer from limitations in data representativeness and the generalizability of their findings. Second, as an increasing number of countries introduce digital nomad visa programs to enhance labor market flexibility and promote digital economies, a pressing question emerges: do these policies effectively influence nomads mobility patterns as policymakers expect? This study aims to address these gaps by examining two core research questions:

RQ1: How physical, economic, cultural, environmental, and institutional distances effect digital nomads global mobility?

RQ2: How digital nomad visa policy interacts with these distance variables?

2 Data and Methodology

Due to the absence of official statistics on digital nomads, we utilize data from Reddit's r/digitalnomad subreddit as a proxy. Reddit is a major online platform organized into topic-specific communities called "subreddits." The r/digitalnomad community, with 2.3 million subscribers and ranking in the top 1% of Reddit forums [12], serves as a primary platform for digital nomads to share experiences and destination advice, making it a valuable research data source. We collected 99,823 posts listing from January 2014 to December 2024 on r/digitalnomad.

After removing advertisements, image-only content, and other noise posts, 48,156 valid posts remained. The Gemini large language model API was utilized to identify origin and destination countries through contextual analysis and semantic reasoning of each post content. The LLM prompt goes as follows: "Which countries are mentioned in the following text: \n {text} \n Please identify and infer based on the context which are the possible origin countries and which are the possible destination countries for the digital nomad, and reply in the following format: \n Departure: (1) the United States, (2) France, ...; \n Destination: (1) Brazil, (2) Indonesia, ...; \n Unsure: (1) China, (2) the United Kingdom, ...". Subsequently, we randomly sampled 400 LLM-generated results and manually compared them with the original texts. The overall accuracy rate of the LLM-generated content was 83%. Among them, one third of the results did not extract location-related information (with an accuracy rate of 98%), and for the remaining texts

that extracted geographical information, the accuracy rate was 76%. The extracted information was aggregated into a panel dataset containing year, origin, destination, and OD flow volume (i.e., the annual international digital nomad inflow from origin to destination; e.g., an OD flow between the US and Mexico equal to 100 means there are 100 posts mention the travel from the US to Mexico in a specific year), yielding 10,643 annual cross-country flow records.

The data reveal the United States as the primary origin, with Mexico, Indonesia, Thailand, and Japan as leading destinations. To validate data quality, we compared the distribution of nomad origins in our dataset with statistics reported by Statista [13]. The comparison yielded high correlations, with Pearson's r=0.97 and Spearman's ρ=0.77, demonstrating strong consistency between our Reddit-derived data and established industry statistics.

As an important tool for studying tourist mobility, the connotation of distance in the gravity model is constantly being enriched. Besides the physical distance in the narrow sense, the differences between regions in terms of economy, culture, infrastructure, and policy can also be regarded as distance variables. In this study, we integrated country-level indicators from multiple sources: cost of living, healthcare, climate, and internet indices (Numbeo), and passport power (Henley Passport Index). A series of distance variables between origin country i and destination country j is constructed as the following methods [14]:

$$Dist_{ij,t} = \frac{indicator_{j,t}}{indicator_{i,t}}$$

Cultural distance (Hofstede's six dimensions) is constructed in Kogut & Singh method. Physical distance was calculated using great-circle distances between population density centers. We also compiled comprehensive information on digital nomad, remote work, and freelancing visa policies worldwide, recording each policy's introduction year.

Our research is divided into two steps: First, we employed a gravity model to explore how different distance variables affect the mobility of digital nomads; subsequently, we compared the impacts of distance effects on digital nomad inflows before and after the introduction of digital nomad visa.

3 Study 1: Distance Effects on Digital Nomad Mobility

We adopted a gravity model, widely used in tourism literature to analyze flows between origins and destinations. The distance variables include geographic distance $Dist_{ij}$, cultural distance $Cult\_Dist_{ij}$, cost distance $Cost\_Dist_{ij,t}$, healthcare distance $Health\_Dist_{ij,t}$, climate distance $Climate\_Dist_{ij,t}$, internet distance $Inter\_Dist_{ij,t}$, and passport distance $Passport\_Dist_{ij,t}$. $POP_{i,t}$ and $POP_{j,t}$ refers to the population of origin and destination countries in a given year t. This study also employed a series of control dummies, including $Covid1_t$, representing the period before and after the pandemic; $Covid2_t$, representing the two years (i.e., 2020 and 2021) most severely impacted by the pandemic; and $Visa_{j,t}$, indicating whether the destination country introduced visa policies for digital nomads in the corresponding year:

$$ln(Flow_{ij,t}) = \alpha_1 ln(POP_{i,t}) + \alpha_2 ln(POP_{j,t}) + \sum_{n=1}^{7} \beta_n \ln(Dist_{ij,t}^{(n)}) + \gamma_1 Covid1_t + \gamma_2 Covid2_t + \gamma_3 Visa_{j,t} + \epsilon_{i,j,t}$$

Before conducting the linear regressions, we performed multicollinearity diagnostics on all explanatory and control variables. The results show that all VIF values are below 3 (mean = 1.46), indicating weak multicollinearity among the variables. This study experimented with several alternative model specifications. To avoid specification-driven artefacts, particularly regarding the distance coefficient, we ultimately adopt the random-effects gravity specification, which preserves variation in both COVID and distance measures and provides more reliable and interpretable estimates for the main variables.

Table 1. Gravity model results.

	RE Model 1	RE Model 2	RE Model 3	RE Model 4
ln population i	0.355*	0.568***	0.578***	0.593***
ln population j	0.188***	0.042	0.058	0.073
ln physical distance	0.016	-0.042	-0.041	-0.049
ln cultural distance		-0.283**	-0.279**	-0.298**
ln cost distance		-1.932***	-1.873***	-1.701***
ln healthcare distance		2.411**	2.394**	2.102**
ln climate distance		0.840*	0.842	0.848
ln internet distance		0.309*	0.257	0.235
ln passport distance		-0.027	0.010	-0.236
Covid1			0.689***	0.329
Covid2			-0.492***	-0.238*
Visa				0.810***
Constants	-8.020**	-9.190***	-10.106***	-10.673***
N	6361	6361	6361	6361
Pseudo R^2	0.124	0.327	0.353	0.393
AIC	100064.74	76830.96	73848.53	69334.35

We also adopted the Poisson pseudo-maximum likelihood (PPML) method to estimate the gravitational model to correct the heteroscedasticity problem of the traditional log-linear OLS model [15]. In the selection of clustering strategies, refer to Shepherd, this study calculates the standard error according to the OD pair [16]. Compared with clustering origin or destination alone, clustering by OD pair provides more accurate inference because error terms in dyadic gravity settings are more likely to be correlated within bilateral pairs [17].

Contrary to traditional migration patterns, physical distance shows insignificant effect on digital nomad flows (β=-0.049), which was confirmed in equal insignificance with alternative measurements of geometric centers of countries (β=-0.046) and the great circle of the capital (β=-0.066). This reflects geographic arbitrage strategies, when

performing their mobility practice, nomads are more concerned about the cost of living (β=-1.701, p<0.001) and cultural distance (β=-0.298, p<0.01) rather than geographical proximity.

In addition, our results show that healthcare distance exerts a significant positive effect (β=2.102, p<0.01) on digital nomad flows. That is, destinations with poorer healthcare conditions are less attractive to digital nomads. This may be related to the fact that digital nomads lack traditional social welfare systems such as public healthcare and employment protection, and thus must seek adequate medical security on their own [18]. Furthermore, we find that the COVID-19 pandemic exerts a significant negative impact (β=-0.238, p<0.05), whereas digital nomad visas have a positive effect on digital nomad flows (β=0.810, p<0.001).

4 Study 2: Interaction between Distance and Visa

Study 2 explore the interaction between destination digital nomad visa policy and distance variables. The interactive gravity model goes as follows:

$$ln(Flow_{ij,t}) = \alpha_1 ln(POP_{i,t}) + \alpha_2 ln(POP_{j,t}) + \sum_{n=1}^{7} \beta_n \ln(Dist_{ij,t}^{(n)}) + \gamma_3 Visa_{j,t} + \sum_{n=1}^{7} \delta_n ln(Dist_{ij,t}^{(n)}) \times Visa_{j,t} + \gamma_1 Covid1_t + \gamma_2 Covid2_t + \epsilon_{i,j,t}$$

The calculation followed the same way as Study 1, incorporating PPML method and OD pair clustering. The interaction results indicate that although passport distance itself is not statistically significant (β=-0.025), its interaction with the digital-nomad visa becomes significantly negative (β=-0.796, p<0.01). This suggests that the introduction of digital nomad visas enhances the attractiveness of destination countries. Prior literature notes that digital nomads often hold high-mobility passports, yet working in a destination country under a tourist status exposes them to institutional and legal risks, such as ambiguous employment relations and unclear tax obligations. By formalizing these institutional arrangements and offering lower tax burdens and more flexible employment regulations, digital-nomad visas reduce such risks and create institutional incentives that ultimately strengthen a destination's appeal to nomads. Additionally, the interaction with climate distance reveals that digital-nomad visas enhance the attractiveness of destinations with favorable climate conditions (β=1.182, p<0.05), which aligns with existing research on digital nomad mobility patterns.

5 Conclusion

This study provides robust empirical evidence on digital nomad mobility patterns and visa policy effectiveness. Study 1 systematically examined how various forms of distance shape digital nomads' destination choices, and Study 2 further extended this analysis by exploring how these mobility patterns shift following the introduction of digital-nomad visas. The findings reveal three key insights that challenge traditional migration

theories. First, physical distance no longer constrains digital nomad flows; instead, geographic arbitrage drives intercontinental mobility from the Global North to the Global South, where greater distance often correlates with larger cost-of-living differentials. It demonstrates that traditional distance-decay models do not apply to digital nomads, whose mobility is driven by economic optimization rather than proximity. Second, cultural proximity emerges as the primary barrier, with nomads prioritizing destinations offering easier social adaptation over geographic convenience. This finding contributes to location arbitrage theory by demonstrating that cultural distance, rather than physical distance, represents the primary friction in arbitrage-driven mobility. This suggests that spatial economics frameworks must incorporate socio-cultural dimensions when analyzing globally mobile knowledge workers. Third, visa policy and its interaction with distance variables confirms that institutional conditions display a crucial role in digital nomad mobility. Existing research has offered extensive discussion on the effectiveness of digital-nomad visa policies, and our empirical analysis provides data-driven evidence that such policies indeed enhance destinations' attractiveness to digital nomads. The interaction effects further reveal that for nomads who already hold high-mobility passports, the introduction of these visas effectively reduces the institutional barriers associated with institutional distance. By helping nomads avoid potential legal and tax risks, these policies strengthen destination attractiveness and make digital nomads more inclined, under otherwise comparable conditions, to choose destinations with better healthcare facilities and more favorable climate conditions. These findings address critical research gaps by providing large-scale quantitative evidence on mobility drivers and policy effectiveness. It also extend governmobility theory by empirically validating how states use visa policies as instruments of selective mobility governance. Digital nomad visas function as biopolitical tools that simultaneously attract economically desirable populations while maintaining regulatory control, confirming theoretical arguments by Mancinelli [11].

Acknowledgments

The work was supported by the National Natural Science Foundation of China (72202208).

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Digital Cultural Heritage & Museum Technologies

AI-Powered Museums: Enhancing Cultural Heritage Artifacts Through Technology

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Abstract. This research focuses on how Artificial Intelligence (AI) can be utilized in museums to offer access to cultural heritage in a way that helps preserve it and enhance visitor experiences, while also examining the ethical implications that accompany its use. The study focuses on the real-time application of AI in museums in the Netherlands, for which research is currently scarce. Using a qualitative case study approach, the research was conducted through expert interviews, visitor surveys, and observations at three major Amsterdam museums: the Rijksmuseum, the Van Gogh Museum, and the Stedelijk Museum. The findings demonstrate AI's value for monitoring artwork and analyzing large collections. However, the study also highlights how AI lacks the cultural understanding necessary for heritage interpretation. Therefore, the research suggests human experts must always be involved, and we propose the new professional function, the 'AI Mediator', tasked with working out algorithmic outputs for the public, auditing for ethical risks, and designing the visitor experience. Key ethical issues identified include the risk of AI perpetuating historical biases and the need to engage with source communities in projects involving their cultural heritage. The paper ultimately concludes that AI can successfully support museums if it is used as a tool under human control, with the AI Mediator role serving as a crucial bridge between technology and culture, under strong ethical guidelines, and a focus on the visitor's choice.

Keywords: Artificial Intelligence, Cultural Heritage, Museum Technology, Ethics, Visitor Experience, AI-Cultural Mediator.

1 Introduction

For museums, AI's technological impact shows a fundamental challenge: balancing what AI is good at—Efficiency—with what makes a museum special—its Essence. When it comes to its efficiency, AI proves to be a transformative tool for technical tasks like predictive preservation, cataloging, and data analysis. Experts see it as a 'game-changer' that can model environmental risks and analyze vast collections quickly. When we consider the museum essence, however, experts contend that a museum's core values lie in its stories, its atmosphere, and the authenticity of its artifacts (Pine & Gilmore, 2011). This is the feeling of standing in front of a Van Gogh and seeing the texture of

his brushwork, something a digital copy cannot replicate. This essence is protected by human judgment; as one expert noted, "an AI can detect a crack in a canvas, but only a human can understand if that crack is historically significant". A fundamental insight that emerged from this research is that efficiency must always protect the essence (Foka et al., 2025).

This fundamental change is seen in audience expectations. Modern visitors increasingly desire to interact with art rather than just observe it, wanting an actively involved personalized experience (Catini, A., 2015). However, this can create a serious imbalance between efficiency and essence. Because the risk of personalization is focusing on individual experiences rather than the data (Foka et al., 2025), resulting in three main risks, which this study will explore: the potential for Cultural Missteps through algorithmic bias, Intrusive Technology that disrupts thoughtful spaces, and Ethical Blind Spots regarding culturally sensitive artifacts. This study specifically focuses on this critical strain within the under-researched Dutch context. The main research question is: How can artificial intelligence support the preservation of cultural artifacts in museums without compromising historical integrity or visitor experience? This paper examines this question through a qualitative case study of three Amsterdam museums, showing findings on how to steer the efficiency-essence divide.

2 Literature review

This literature review on AI in cultural heritage highlights some key aspects of its use, showing both its transformative potential and its major ethical risk (Tiribelli et al., 2024). Experts point out AI's major potential to transform the field of preservation and engagement. Technologies like image recognition, predictive environmental monitoring, and 3D scanning enable nondisruptive conservations and the creation of digital archives (Akyol & Avci, 2023; Laohaviraphap & Waroonkun, 2024). This is shown by initiatives like the EU RePair project[1] which uses AI and robotics to physically reconstruct ancient artifacts (RePAIR Project, 2024). At the same time, AI improves visitor engagement through personalized tours, augmented reality, and multilingual chatbots, making cultural content more accessible and engaging (European Parliament, 2022; UNESCO, 2021). Furthermore, research in museum management emphasizes that successful technology integration must enhance rather than replace the authentic museum experience, requiring careful design that respects the contemplative nature of cultural spaces (Pine & Gilmore, 2011).

However, a second, major thread in the literature highlights significant ethical risks. Crucially, recent research by Foka et al. (2025), for example, introduces the concept of the 'bias loop' demonstrating how historical biases in training data can become intensified and regularized through AI systems. Their work provides concrete evidence of how algorithmic bias operates as a frequent rather than a one-time error, requiring mitigation strategies. This theoretical framework directly informs our study's examination of gender bias in the Stedelijk Museum's AI recommendations and shows the necessity of the

[1] https://www.repairproject.eu/project/

ethical gatekeeping pillar in our proposed AI Mediator framework (see further). Researchers warn that AI is lacking humanity and cultural understanding, can misrepresent sacred artifacts, and extend historical biases rooted in training data (Tiribelli et al., 2024).

Research by Tiribelli et al. (2024) shows a lack in, finding that most AI projects focus on technical performance over community involvement, something which is troublesome for collections from the colonial past. Practice is also lacking research on how museums are navigating these challenges, despite the few emerging initiatives (like the ICOM final resolution nr 3[2] or The Museum+AI Toolkit[3]), especially within the innovative Dutch museum sector, a gap this study aims to answer.

3 Methodology

This research used a qualitative, multiple-case study design to show a nuanced analysis of AI's implementation. The cases were three leading museums in Amsterdam, selected for their distinct profiles: The Rijksmuseum, for its large-scale AI-assisted restoration projects (e.g., The Night Watch); the Van Gogh Museum, for its focus on deep, personalized visitor experiences; the Stedelijk Museum for its modern collections that present unique interpretive challenges for AI.

Data was collected through semi-structured interviews with 7 museum professionals (curators, conservators, digital managers) who were selected through a purposive sampling, based on their involvement with AI, and a 10-visitor survey and observation were conducted at the location, in the public area of the museum. This was complemented by structured observations of AI-powered exhibits. The data were analyzed using thematic analysis.

The different AI applications investigated in this study include computer vision (for restoration and monitoring), machine learning-based recommendation algorithms (for personalization), and natural language processing (for collection analysis and chatbots).

4 Findings

The thematic analysis revealed five central themes, summarized in Table 1 below, with detailed explanations following.

[2] On 'Positioning museums for an equitable, ethical and sustainable digital future through technologies', ratified during the 27th ICOM General Assembly, held in Dubai in November 2025.

[3] https://themuseumsai.network/tookit/

Table 3. Qualitative evidence from expert interviews, visitor surveys, and observations.

Theme	Expert Insight	Visitor Response	Observation
AI as support Tool	"Predictive preservation is a'game-changer'..." (Conservator)	"Supportive if purpose is clear..." (Student)	High engagement at restoration displays; tech-enhanced without distracting.
Human judgement	"AI can see a rip, but not its history..." (Curator)	"The art itself is the best guide." (Visitor)	Parent explained: "The Computer helped, but people painted."
Ethical & Cultural Sensitivity	"Retrained AI suggesting only male artists." (Researcher)	"Want cultural experts involved, not just AI." (Visitor)	AI bias checks occur behind scenes; not visible in galleries.
Visitor Experience	"AI as 'smart guide in pocket'." (Digital Manager)	Families: "Fun!" Older: "Just want to feel emotion."	Clear divide: families used guides; older visitors ignored tech.
AI Mediator Role	"Curating the AI, not just the art." (Curator)	"Expect clear labeling of AI content." (Visitor)	Museums deliberately label AI-generated content.

Theme 1: AI as a Transformative yet Assistive Tool.
A conservator from the Van Gogh Museum described predictive preservation as a "game-changer," allowing them to "model how a crack might develop over the next 50 years and act now to stop it." A student at the Rijksmuseum found the AI restoration of The Night Watch "really cool," but support was contingent on the technology's purpose being clear and its goal being the protection of the original artwork.

Theme 2: The Primacy of Human Judgment over Algorithmic Authority.
A Rijksmuseum curator powerfully illustrated this: "An AI can see a rip in a canvas, it can't tell if that rip was made by a soldier during a war and is now an important part of the painting's history. A human expert understands that." This perspective was mirrored by visitors, who valued the emotional and human connection to art, underscoring a shared belief that the essence of heritage lies beyond algorithmic analysis.

Theme 3: Ethical Application and Cultural Sensitivity as a Non-Negotiable Priority.
Experts demonstrated a keen awareness of ethical risks, particularly bias. A researcher from the Stedelijk Museum provided a concrete example: "The same AI, when asked to suggest important modern artists, only talked about male artists. It had learned this bias from old archives... We had to retrain it with a more balanced dataset." For culturally sensitive collections, professionals emphasized community co-creation, with one

curator stating that "sometimes, the most respectful choice is to not use the technology at all" without community involvement.

Theme 4: Enhancing Visitor Engagement: A Spectrum of Acceptance.
Experts were optimistic about personalization and accessibility, envisioning AI as a "smart guide in your pocket." Visitors' data, however, revealed a clear spectrum: Families and younger visitors responded enthusiastically; a parent noted that interactive games "turned looking at art into a fun adventure." In contrast, older visitors consistently preferred quiet contemplation, with one stating a preference to "just stand and feel the emotion." Observations confirmed this divide, highlighting that successful integration depends on seamless design and offering AI as an opt-in enhancement.

Theme 5: The Emergent AI Mediator Role.
The research proposes the adoption of a new professional function: the **AI mediator**. This role extends beyond traditional curation to specifically manage the interface between AI systems and cultural content, resting on three pillars as seen in the figure below (Fig. 1):

1. Contextualization and Framing: Translating the algorithm's output for the public.
2. Ethical guard: Actively auditing AI for bias and ensuring sensitivity.
3. Human-centered integration: Designing how visitors encounter AI. A curator explained this as actively "curating the AI,", not just the art.

Fig. 11. The AI Mediator Framework.

5 Discussion and conclusion

This study shows that the value of AI in museums is dependent on a single principle: Efficiency must serve Essence (see Figure 1). The identified risks—algorithmic bias, intrusive technology, and ethical blind spots—confirm those recognized in the literature. The case of the gender-biased algorithm at the Stedelijk Museum provides a concrete example of the "bias loop" described by Foka et al. (2025), moving the ethical debate from abstraction to actionable evidence. This is directly supported by research

by Foka et al. (2025), which states that technical performance often overshadows community involvement by regulating ethical oversight and community engagement as a main job responsibility.

Furthermore, this study showcases an essential solution: the Three-pillar Framework the AI Mediator. This role, built on the previously discussed Contextualization, Ethical Gatekeeping, and Visitor Experience Bridging, provides the structured human oversight needed to implement ethical and ethnic community involvement and bias mitigation (Tiribelli et al., 2024). It ensures that human decisions continually guide technological capabilities.

Finally, the range of visitors' acceptance challenges a one-size-fits-all approach, showing that demographic segmentation is crucial for aligning AI engagement tools with the diverse expectations of the modern museum audience.

To conclude, this study proves that AI can successfully support the preservation of cultural artifacts and enhance the corresponding visitor experience of such artifacts, but only when implemented as a tool under definitive human control. The critical tool for achieving this balance is the AI Mediator. This role is structured based on the three-pillar framework, as shown in Figure 1, to ensure human-in-control, ethical considerations, and visitor-centric design guiding all AI implementations. The future of museums, therefore, lies not in automation, but in augmentation—a collaborative partnership where technology enhances human expertise to create more insightful, accessible, and respectful cultural institutions.

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Artificial Intelligence in Museum Apps: Insights from Visitor Surveys in Madrid

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Abstract. Artificial Intelligence (AI) is transforming mobile applications for museum visits, expanding possibilities for personalization, accessibility, and interaction. This study analyses the integration of AI functionalities in museum apps through a visitor survey conducted in five major museums in Madrid (N = 201). Findings reveal that visitors value autonomy and understanding—particularly through adapted explanations, image recognition, and spatial guidance—while entertainment or commercial features are less appreciated. Participants express strong trust in museum-authored AI systems and expect these tools to deliver more personalized and engaging experiences.

Keywords: Smart Tourism, Artificial Intelligence, Museum Experience, Mobile Applications, Visitor Engagement.

1 Introduction

Over the past two decades, the evolution of Information and Communication Technologies and the emergence of smart tourism have profoundly transformed how travellers plan and experience their journeys, as well as how cultural institutions manage visitor engagement [1, 2]. Mobile applications have become central tools in this transformation, offering itinerary planning, navigation, user-generated reviews, and personalized content delivery [3, 4]. In museum contexts, these apps increasingly function as digital guides, enhancing autonomy and enabling visitors to explore collections at their own pace [5].

Artificial Intelligence (AI) has emerged as a key enabler of this shift, addressing limitations in personalization, accessibility, and content relevance [6]. AI-powered features such as chatbots, virtual assistants, and adaptive recommendation systems are redefining the museum visit experience by facilitating multilingual interaction, contextual content generation, and inclusive design [7, 8]. However, these innovations also raise concerns around content governance, ethical safeguards, and institutional control over cultural narratives [9].

This paper investigates the integration of AI into museum visit applications based on empirical evidence from a visitor survey conducted in Madrid. The study aims to identify the most valued AI functionalities, understand user expectations, and propose design and governance recommendations for AI-enabled museum experiences.

2 Literature Review

2.1 Smart Tourism Technologies and Digital Visitor Experiences

Smart Tourism Technologies (STTs) refer to digital tools and platforms that enhance the tourist experience through personalization, interactivity, and contextual relevance [10]. These technologies have evolved from basic information and booking systems to sophisticated applications that support itinerary planning, navigation, and real-time engagement [1, 2, 3]. The widespread adoption of smartphones and improvements in connectivity have positioned mobile apps as central instruments in tourism, particularly in cultural contexts such as museums [4].

STTs are characterized by five essential attributes: reliability, interactivity, personalization, accessibility, and privacy protection [11, 12]. These features contribute to memorable and emotionally resonant experiences, especially when supported by advanced technologies such as Natural Language Processing (NLP), Internet of Things (IoT), and extended reality [13]. In museum environments, mobile apps and audio guides offer immersive and inclusive experiences, increasing visitor satisfaction and autonomy [14].

The digitalization of tourism has also shifted expectations, with traveller's demanding more control, flexibility, and emotional connection. As destinations and institutions adapt, user-centered design becomes critical to ensure usability and relevance across diverse visitor profiles [17]. This transformation has led to hybrid models that blend physical and virtual experiences, redefining how cultural content is accessed and interpreted [18].

However, the scope of STTs extends beyond the visitor experience to structural dimensions. As highlighted by Filimonau and Naumova [19], digital technology plays an increasing role in ensuring the business efficiency and long-term sustainability of tourism enterprises. Consequently, the evolution of smart tourism is now characterized by leveraging these technologies to improve destination competitiveness, drive innovative practices and resilience [20,21].

2.2 AI-Powered Museum Applications: Functions, Motivations, and Design Challenges

Museum visit applications typically fulfil four core functions: instrumental (navigation and logistics), social (entertainment and sharing), interactivity (digital assistance), and communicative (contextual content delivery) [5]. These functions align with user motivations that are hedonic (enjoyment and personalization), utilitarian (efficiency and resource optimization), and dispositional (personal and contextual factors) [5].

AI technologies enhance these functionalities by enabling personalized assistance, adaptive content delivery, and multilingual interaction. Chatbots and virtual assistants simulate natural conversations and support visitors across various stages of the visit [22]. These agents are categorized into task-oriented, social, knowledge-based, and hybrid types, each offering distinct benefits depending on the visitor's needs and context [22].

Recommendation systems, some of which integrate Large Language Models (LLMs), analyze user behavior to suggest tailored itineraries and content [23, 24]. While these systems offer flexibility and contextual adaptation, they also present challenges related to bias, hallucinations, and transparency—especially in culturally sensitive environments [9, 25].

Despite their potential, AI-powered applications must address usability barriers, such as interface complexity, accessibility limitations, and content reliability [5, 16]. Successful implementation depends on ethical design, institutional oversight, and the ability to adapt to diverse user profiles.

3 Methodology

A quantitative field survey was conducted in 2025 among visitors of five major museums of Madrid. Sampling was non-probabilistic and opportunistic in museum vicinities. The questionnaire (Spanish/English) combined multiple-choice and Likert-type items (1–5) to capture socio-demographics, visit characteristics, use of resources, preferences for mobile content types, and perceptions of nine AI features. In total, N = 201 valid responses were collected; data were analysed descriptively.

4 Results

The survey (N = 201) revealed a diverse and highly educated visitor profile. A majority resided in Spain (58%), followed by the Americas (22%) and other European countries (16%). Among respondents, 38% were middle-aged, 65.5% were employed, and 86.5% held a higher education degree. Museum visits were largely social, with most visitors attending in groups—couples (36%), friends (28%), or family members (27%). Additionally, 70% were visiting for the first time.

In terms of resources used during the visit, printed brochures and signage remained dominant (71%), while digital tools showed uneven adoption: interactive points (32%), museum websites (22%), audioguides (12%), AI assistants (10%) and official apps (3%). Overall, 83% of respondents reported that the resources they used improved their experience, reflecting a general satisfaction with the available information and communication resources.

Preferences for mobile content prioritised educational depth and personalisation. Interactive visualisations on artistic processes (mean 4.3) and adapted explanatory texts (4.2) were the most valued, followed by classic media formats such as photos and audio narration (both 3.8). Behaviour-based suggestions and videos received moderate interest (3.5), while social and playful features—user-generated content, polls and games—were more polarised. The least appreciated were collaborative activities (2.6) and relaxation content (2.5).

Perceptions of AI-based features followed a similar pattern of pragmatic selectivity. Visitors valued most highly those functions that facilitate learning and navigation. Adaptive explanations tailored to individual knowledge levels achieved the highest rating (mean = 4.4, 89% positive responses), followed by image recognition for accessing

artwork information (mean = 4.3, 85%) and in-museum orientation tools (mean = 3.9, 72%). Personalized routes based on interests (mean = 3.7, 64%) and chat-based interaction with AI (mean = 3.4, 58%) received moderate approval, whereas features related to hands-free voice access, AI-driven games, and commercial services such as bookings or purchases were perceived as less useful (means ≈ 2.6–2.8).

Finally, visitors' attitudes toward the broader use of AI in museums were overwhelmingly positive. Eight out of ten respondents (80%) stated they would prefer museum-developed AI guides over general-purpose tools such as ChatGPT, revealing a strong level of trust in institutional authorship. In addition, 77% believed that AI would allow for more personalized experiences, and 60% expected that it could increase their motivation to visit museums. The perception of risk was notably low: 65% disagreed that AI could harm a museum's identity, and 53% did not consider AI-generated content unreliable.

5 Conclusions

This research has expanded understanding of visitor behavior, preferences, and perceptions regarding the museum visit experience, the types of content most valued, and the degree of acceptance toward AI-based solutions. These insights are highly relevant for guiding the development of digital applications that better respond to visitor expectations. While printed materials remain the most widely used resources, digital tools—such as interactive points, websites, audioguides, and virtual assistants—are gaining moderate adoption. Visitors show particular interest in mobile content that deepens artistic understanding, especially through interactive visualizations and explanatory texts tailored to their cultural level and interests. AI is perceived as most useful when it enhances interpretation and spatial orientation within exhibition spaces. In contrast, its value is seen as limited for commercial transactions, voice-based access, or entertainment purposes. Respondents express a clear preference for museum-developed AI guides and anticipate more personalized experiences, with low perceived risk to institutional identity or content reliability. Although the study employed a non-probabilistic sampling method, which limits the generalization of results and disaggregation by museum, the findings are of significant interest and provide a foundation for future research and institutional development.

Building on this baseline, future investigations should prioritize probabilistic sampling designs to validate these trends across the broader population and enable granular, institution-specific analyses. Subsequent studies should also examine how demographic and cultural variables influence AI acceptance to ensure cross-cultural applicability. Furthermore, research must address the risk of cognitive overload by evaluating how adaptive interfaces can progressively disclose advanced features based on user familiarity. Finally, the scope should expand beyond the visitor perspective to include museum managers and curators. Contrasting institutional concerns with visitor expectations is critical to identify potential gaps regarding ethical governance, data privacy, and the preservation of cultural narratives.

Acknowledgements

This research was funded through the ELSTER 1.0 project, led by GVAM GUIAS INTERACTIVAS SL and supported under the 2023 "Última Milla" call for innovative, technology-based projects for SMEs, within Component 14 of Spain's Recovery, Transformation and Resilience Plan (Next Generation EU), aimed at accelerating digital transformation in the tourism sector.

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Zoom Gaze: a netnographic exploration of Zoom screen captures in cultural tourism

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Abstract. In the last few years, video-conferencing platforms (VCPs) like Zoom have emerged as a fast-growing virtual context for tourism. Nowadays, the platform has become institutionalized in the field and the new notion of Zoom Gaze has emerged from a new photographic practice: Zoom screen captures. In this paper, we explore the emerging aesthetic of Zoom screen captures to unpack the concept of Zoom Gaze. To reach our goal, we conducted a netnography of this new photographic practice in the context of cultural tourism. Our findings depict Zoom screen captures as the repository of a new tourist gaze that privileges sociality over individuality and re-centers the destination, which becomes a site of crowdsourced acculturation and shared sociality.

Keywords: Zoom Gaze, video-conferencing platforms, Zoom, selfie, netnography.

1 Introduction

Since the last few years, VCPs such as Microsoft Teams and Zoom offered a lifeline to sectors severely impacted by restrictions, including tourism. Among them, Zoom proved especially valuable, because due to its unique affordances it provides an experiential format that enables participants to socialize and explore new environments and cultures despite physical immobility. The format became so engaging that it has since been institutionalized, with many Destination Management Companies (DMCs) now operating fully on Zoom (e.g., Rambling London Tours; Unexpected Virtual Tours' Cooking in Umbria). Recent announcements also show Zoom's growing and future investments in tourism. Zoom has in fact announced in 2024 that the platform is going to include more augmented and virtual reality options, to deepen the experiential dimension of its tourism-oriented offerings (Zoom Official Website). Within this evolving landscape, Larsen in 2024 has introduced the concept of the "Zoom Gaze", a novel tourist gaze emerging through the use of VCP that advances Zoom as a tool engendering novel forms of tourism more local and sustainable. Central to this emerging gaze is the rise of a novel and unique photographic practice: Zoom screen captures. Since 2020, when Zoom exploded during COVID-19 lockdown as a platform for tourism experiences, both hosts and participants have increasingly taken screenshots of their Zoom-based tourism experiences and shared them on social media. These images document not only the virtual environments being explored, but also the self-presentation and social interaction of participants as mediated through Zoom's specific affordances.

Much like user-generated touristic photos shared on social media, Zoom screen captures actualize and disseminate this new form of tourist gaze. Despite Zoom's institutionalization and the mass circulation of these images, the contours of the Zoom Gaze and so of the Zoom screen capture remain underexplored. Existing research on the tourist gaze (Urry, 1990) has examined its evolution through digital technologies and social media. Initially conceived as a culturally organized way of looking at destinations shaped by institutional visuals, the tourist gaze was later reconceptualized as a performative act (Urry & Larsen, 2011). This shift has been studied primarily through user-generated content (UGC), with the selfie becoming central to contemporary redefinitions of the gaze (Dinhopl & Gretzel, 2016). The rise of the selfie transformed tourism imagery from documenting extraordinary places to presenting the self as extraordinary within them (Dinhopl & Gretzel, 2016). However, despite this extensive scholarship, new platforms such as VCPs, and Zoom in particular, remain largely unexamined. Existing studies on Zoom's role in tourism have mostly addressed its pandemic-era functions in sustaining cultural programming, heritage preservation, and social connection (Barker & Rodway-Dyer, 2023). This study addresses this gap through an in-depth netnography of Zoom screen captures in the context of cultural tourism, exploring how VCPs reconfigure the tourist gaze.

2 Theoretical Background

2.1 The evolution of the Tourist Gaze

Urry's (1990) original notion of the tourist gaze defined it as a culturally structured act of looking, shaped by institutional visual narratives, and subsequently actualized through visual media like analog photography. The rise of digital technologies challenged this definition, reconfiguring it as a more "performative practice" (Urry & Larsen, 2011), underscoring its multisensuous nature (Perkins & Thorns, 2001) and emphasizing tourists' active role in its creation and dissemination (Robinson, 2014; Lee et al., 2023). Tourist with digital technologies started to create and share online their own gazes at destinations through UGC. This content has become the primary source of inspiration for prospective travelers and a key mechanism for social validation among tourists over the past fifteen years (Dinhopl & Gretzel, 2016). Recent studies exploring the role of user-generated content have predominantly focused on selfies (Dinhopl & Gretzel, 2016). These works have demonstrated how the selfie represents a diffused form of the tourist gaze, wherein the tourist's own body displaces the destination as the primary subject of visual storytelling (Dinhopl & Gretzel, 2016). Together, these contributions emphasize the tourist gaze as a fluid, evolving concept that is increasingly shaped by technocultural developments and currently characterized by an inward orientation that often shadows the destination itself. However, today, tourists have access to a wide array of digital technologies through which to construct and disseminate their visual narratives. Yet, scholarly attention has largely centered on the role of digital photography, particularly selfies, and social media in shaping the tourist gaze. Other visual formats and technologies now available to tourists, such as VCPs, remain significantly underexplored, even if they and are now increasingly integrated into tourism practices, creating new dimensions of tourist gaze.

2.2 Video-conferencing platforms and tourism

During the COVID-19 lockdowns, VCPs became essential for the tourism industry, enabling DMCs to reconfigure their offerings into virtual formats and mitigate the effects of travel restrictions. Among these, Zoom rapidly emerged as the preferred platform for leisure and so for tourism. Airbnb, for instance, repositioned all its experiences on Zoom. Its adoption has persisted beyond the pandemic, becoming increasingly institutionalized within the sector. Services such as ***Unexpected Virtual Tours*** and ***WorldVirtualTours*** have built their business models entirely around Zoom, while others, including Rambling London Tours; ***Cooking in Umbria*** now offer hybrid experiences combining Zoom-based and in-person components. Zoom success can be attributed to its distinctive sociotechnical affordances, which foster socialization, self-presentation, and engagement with destinations (Cirucci, 2023). This success prompted Larsen (2024) to introduce the concept of the ***Zoom Gaze*** presenting the VCP as a medium capable of fostering more localized, sustainable, and participatory forms of tourism. Since 2020, this gaze has popularized a new photographic format: the ***Zoom screen capture***. These captures—snapshots of the Zoom interface taken by participants—simultaneously display the self, other participants, and the virtual flow of experience, and are widely shared on social media. Despite the introduction of the "Zoom Gaze" and the growing circulation of Zoom screen captures, studies on these new forms of Zoom-enabled tourism looking are missing in tourism literature. Tourism debate has primarily focused on Zoom's potential role for the field during times of crisis (Barker & Rodaway-Dyer, 2023). To date, no studies have systematically unpacked the notion of the “Zoom Gaze” by analyzing Zoom screen captures as a photographic-medium through which individuals engage in Zoom tourism experiences and construct a distinct visual experience. Specifically, these research questions guided this aim: i. what are the defining characteristics of Zoom screen captures and in what ways do they contribute to the formation of a Zoom Gaze? ii. How do interactions between gazers and VCPs, as captured in Zoom screen imagery, shape the tourist experience articulated through the Zoom Gaze?

3 Context & Method

This study focuses on the context of cultural tourism, specifically cooking classes, city tours, and museum tours conducted on Zoom. These experiences typically consist of live, synchronous sessions delivered in real time by domain experts. They are designed to last between one and two hours, in order to offer immersive encounters with cultural, historical, or culinary themes through guided virtual tours in culturally relevant destinations and live demonstrations (Pogue, 2020). In their structure, they expose participants to environments that are geographically distant and culturally unfamiliar, projecting the sights, rhythms, and atmospheres of remote places into the domestic sphere. These experiences, have been the main to be repositioned onto the platform since 2020 and this enabled us to conduct a long-term and extensive observation of diverse screen captures and gaze practices they evoke. Given that Zoom screen captures emerge from online experiences and are widely circulated on social media, an interactive netnographic approach was adopted (Kozinets, 2020). Following the movements of

netnographic immersion, we engaged in a multimodal collection of Zoom screen captures and related conversations published from 2020 to 2025. We began by retrieving archival materials on Zoom tourism experiences accumulated during this period, then collected screen captures and conversations from social media platforms—Facebook, Instagram, LinkedIn, and TikTok—for their visual focus, and TripAdvisor and Airbnb for their tourism orientation. Content on Facebook, Instagram, LinkedIn, and TikTok was located using a comprehensive set of hashtags and keywords derived from the archival analysis (#virtualtour, #Zoomtour, #Zoomcooking, #Zoomcookingclass, #foodtourism, Zoom travel, Zoom cooking class). Content on TripAdvisor and Airbnb was gathered by filtering all the reviews related to cultural tourism experiences offered by the ten leading cities for cultural tourism, according to the Euromonitor Reports (2021, 2022, 2023, 2024, 2025), using "Zoom" and "virtual" as search queries, and then focusing on those that included Zoom screen captures. We collected those screen captures published from 2020 (when the phenomenon of tourism experiences through and on Zoom began) to 2025 (the current period). We included only those photos that showed at least two participants connected on Zoom. During our immersion, we kept immersive journals that we repeatedly updated with screen captures and conversations to systematically monitor content collection and enhance data integration. To then enrich contextual understanding, we also participated in four live Zoom city tours and cooking classes, collecting six additional screen captures. Furthermore, ten in-depth interviews were conducted with a purposive sample of Zoom hosts and participants featured in the retrieved captures to explore their motivations for the snap, performative gestures, and use of social media affordances. The preliminary dataset comprises 501 Zoom screen captures, 112 online comments, and 69 archival sources. The analysis of Zoom screen captures was conducted by the three researchers and followed an iterative, hermeneutic approach in which each image was examined in relation to the evolving understanding of the dataset as a whole (Thompson et al., 1994). We first assessed the captures holistically, identifying affinities with established forms of the tourist gaze. We then conducted a fine-grained observation of the specific practices depicted, informed by Pink's visual methodologies (2020). Finally, we developed an emergent interpretative analysis in which these observed elements were repeatedly compared with tourist gaze theory and progressively abstracted into new conceptual categories.

4 Findings

In presenting our findings, we illustrate the distinctive elements of the Zoom Gaze as revealed in Zoom screen captures across three different domains of practices: (1) self-presentation practices, (2) group-presentation practices, and (3) place-presentation practices.

4.1 Self-presentation practices: a carefree aesthetic

In Zoom screen captures, both participants and hosts appear arranged in the equalizing format of Zoom's gallery view, which emphasizes their upper body and, by extension,

their personal appearance, which signals a preference for comfort and domestic informality (they are typically reported as wearing pajamas, a sweater, and a baseball hat) (see Figure 1). This comfy aesthetic marks a clear departure of Zoom screen captures from selfie, where individuals adopt highly curated and aesthetically polished appearances (Murray, 2015), often involving styled hair, coordinated outfits, and the use of makeup. This informal ethos in Zoom screen captures is specifically adopted as participants prefer to live a social moment of virtual togetherness instead of dedicating themselves to curate their virtual appearance. This is further evidenced by the frequent presence of visual imperfections in Zoom screen captures, caused by technical disruptions such as blurring or moiré effects (see Figure 1) resulting from unstable internet connections but also because participants are typically caught mid-action, assuming social and celebratory gestures such as toasts or speaking with each other (Figure 1). The dynamic composition of Zoom screen captures aside from the recurring presence of the photographer, further distances the social and carefree aesthetics of Zoom screen captures from that of the selfie, where static, composed poses are preferred (Dinhopl & Gretzel, 2016).

4.2 Group-presentation practices: an individualized consociality

The social orientation of Zoom screen captures becomes particularly evident when considering the social practices that they document. Beyond depicting participants in motion, these images are often taken when hosts and attendees engage in real-time exchanges. During our participation in a Zoom virtual tour, we observed that the capture occurred precisely as the host narrated their travel experience in Mexico City while posting the hotel's website link in the chat, an action that prompted a wave of engagement, with participants simultaneously expressing their intent to click.

These social practices are further shaped by the intimate domestic settings that frame Zoom tourism encounters. Unlike conventional selfies, which typically feature outdoor environments (Christou et al., 2020), Zoom captures often display everyday interiors such as living rooms or kitchens. Though these spaces appear only in participants' backgrounds, their repetition produces the impression of a unified virtual home where people cook, converse, and connect. As Kelly noted in our interview: "seeing everyone seated in their living room, I felt like we were together in the same big house". Our observations indicate that Zoom screen captures are often taken during moments of heightened social presence—when gestures and domestic spaces converge and a sense of togetherness materializes. These photos thus become emblematic visual artifacts of shared social moments. Moreover, they rarely circulate in isolation: embedded within multimodal storytelling frameworks, they are accompanied by social emojis (e.g., friends hand in hand) and hashtags (e.g., #virtualtogether, #onlinetogether) that frame them as records of meaningful collective experiences.

4.3 Place-presentation practices: a fragmented but expanded destination

Beyond familiar indoor scenes, Zoom screen captures, especially those from virtual tours, also portray outdoor environments where the destination becomes the main subject rather than a backdrop. This marks a shift from the selfie's aesthetic, which centers

on the self and relegates place to the background (Gretzel & Dinhopl, 2016; Christou et al., 2020). Interviewees noted that such captures often occur when meaningful views, are visible: “When I look at this photo, it reminds me of a lived social moment and of Mexico City, through these views, I created a fuller idea of the city” (Andrè), preserving both the social and educational value of the tour.

Another prevalent visual strategy of place presentation in Zoom screen captures is the adoption of virtual backgrounds portraying outdoor glimpses of destinations. Even if in this case, these virtual backdrops largely remain in the background, participants use them to recreate the temporal atmosphere associated with a travel experience. In Figure 2, for instance, two participants choose distinct virtual backgrounds that together construct a chronological sequence—departure, exploration, and leisure—transforming the Zoom interface into a symbolic journey. Participants frequently accompany these captures with hashtags such as #virtualtravel, reinforcing their shared narrative. Interviewees also emphasized that virtual backgrounds are intentionally used to portray destinations, heightening the immersive quality of these experiences. In Figure 2, participants reproduce different views of Paris landmarks across seasons, creating a panoramic, multi-sited reconstruction of the destination that offers a more expansive experience than the single viewpoint typical of the selfie.

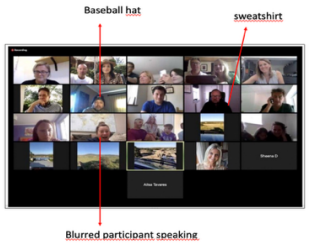

Fig. 1. Fragment from our immersion journal showing self-presentation practices in a Zoom safari screen capture. Source: Authors own elaboration

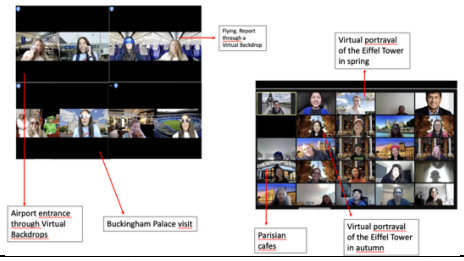

Fig. 2. Fragment from our immersion journal showing a travel reconstruction and a Paris trip trough virtual background. Source: Authors own elaboration

5 Discussion

This study examined the diffusion and institutionalization of VCPs, particularly Zoom, within cultural tourism experiences, and explored the characteristics of the Zoom Gaze (Larsen, 2024) emerging from these mediated experiences. Central to this analysis was the investigation of Zoom screen captures as a new touristic photographic practice that visualizes and disseminates this gaze. Findings indicate that the Zoom Gaze differs markedly from previously theorized digital gazes. In particular, it differs from the self-direct tourist gaze of the selfie centered on individual performance and self-promotion (Dinhopl & Gretzel, 2016). Zoom screen captures depict comfortable, spontaneous, and socially cohesive moments. They foreground collective participation and conviviality rather than self-display, aligning more closely with mutual and intra-tourist gazes that emphasize co-presence and interaction. The analysis also reveals a reconfiguration of the destination’s representational role. Real locations frequently occupy the central visual space of Zoom screen captures, functioning as anchors for shared cultural learning

but also for social exchange. Simultaneously, virtual destinations serve as mnemonic devices, enabling participants to re-enact and extend the travel experience while collectively constructing knowledge about place. Overall, this study advances tourist gaze scholarship by theorizing the Zoom Gaze as a collective and socially embedded mode of visual engagement that foregrounds intersubjective sociality rather than individualized self-presentation, and that recenters the destination as a locus of shared meaning-making and collaborative acculturation. In doing so, it identifies a novel mode of experiencing tourism—one that is digitally mediated, collectively enacted, and grounded in co-presence rather than physical mobility. Relatedly, the study proposes a new understanding of place experience, wherein destinations are encountered through shared, synchronous engagement and are rendered meaningful through a deliberate orientation toward social acculturation. In parallel, this study extends the literature on VCP as constitutive means of tourism. It demonstrates that platforms such as Zoom operate as technologically mediated experiential environments capable of reproducing salient sociocultural dimensions traditionally associated with physical travel—presence, sociality, and cultural learning—even in the absence of corporeal mobility. By evidencing how tourism can be enacted through digitally sustained co-presence, the study broadens prevailing conceptions of the spatial, relational, and material conditions under which tourism becomes possible. From a managerial perspective, understanding this gaze equips hosts and destination managers to design more strategically targeted digital tourism experiences. In particular, it highlights the importance of intentionally activating participant interaction in order to shift participants from passive viewers to co-experiencers. Additionally, by foregrounding social visibility and digitally mediated co-presence, managers can cultivate a stronger sense of group belonging, deepen emotional attachment to the destination, and enhance cognitive engagement with its cultural meanings, thereby strengthening participants' connection to place and their willingness to sustain engagement beyond the virtual encounter. Moreover, the insights of this study can inform communication and branding efforts adopted to promote digital tourism experiences: emphasizing the socially shared and expanded nature of destination experience may render promotional narratives more compelling and better aligned with the expectations of potential participants.

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Driving the Tourist Gaze: Exploring Tourism 'In' and 'Through' Racing Video Games

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Abstract. Video games are a fast-growing context for travel inspiration and tourism consumption, with emerging concepts as "digital gazing" rising to capture how these digital and immersive environments are generating novel forms of tourist outlook. In this paper, we explore the tourist gaze practices that emerge from video games to unpack the concept of Digital Gaze. To achieve this, we conducted a netnography of racing video games. Findings reveal that video games cultivate both a physical tourist gaze, grounded in the institutionalized and performative traditions of tourism, and an in-game gaze that unfolds as a more proactive and participatory form. In doing so, the study also sheds light on new tourism motivations driven by digital immersion and the interplay between virtual and physical travel experiences.

Keywords: videogames, tourist gaze, destination image, netnography.

1 Introduction

The tourist gaze (Urry, 1990) was originally conceived as a culturally organized way of looking at destinations shaped by institutional visuals. It was reconceptualized in the digital era as a performative act (Urry & Larsen, 2011), acknowledging its multi-sensuous nature (Perkins & Thorns, 2001) and the role of technology in enabling tourists to construct and share their own gazes through user-generated content (UGC) (Robinson, 2014). UGC has, in fact, become the primary means through which the tourist gaze is expressed and tourism inspiration is generated. For this reason, in the last 15 years, the literature of tourist gaze has focused on defining the concept in relation to these technologies (Dinhopl & Gretzel, 2016; Robinson, 2014; Canavan, 2020; Kahana, 2024). However, very recent reports from the Pew Research Center (2024) and We Are Social (2024) reveal that younger generations (so called Millennials and Gen Z) are increasingly turning to more interactive and agentic digital environments, such as AI (e.g.: ChatGPT planned my travel), streaming platforms, and even more strikingly, video games, for the creation of tourism content and for travel inspiration.

These platforms are also introducing new ways of tourism consumption, so of gazing. In fact, Larsen (2024) has recently introduced the concept of "digital gazing" to capture how technologically mediated environments generate novel forms of tourist

outlooks. Yet, how this gaze is configured across specific digital and immersive contexts remains underexplored. This gap becomes particularly salient in light of the rapid growth of the video game industry. Video games are becoming a powerful medium for tourism- related experiences. Indeed, tourism literature has already explored the positive impact of gamification in enriching tourism experiences (Huang et al., 2013; Wei et al., 2023; Xin et al., 2022; Salmond & Salmond, 2016; Skinner et al., 2017; Mavragani & Paliouras, 2022) and its role in cultural promotion (Dubois & Gibbs, 2017; Wei et al., 2023). Additionally, more recent studies have highlighted the role of video games in shaping destination images (Sharma et al., 2023; Dubois et al., 2021).

However, this most recent literature has yet to examine how these destination images influence tourist gazes and, in turn, which new travel motivations they might generate. Therefore, this study is constructed to fulfill this gap, specifically guided by these research questions: (i) What tourist gaze practices do players implement in the real destinations seen in games and in in-game destinations? And for which reasons? (ii) How does the tourist gaze change when inspired by a digital and participatory context like video games compared to the social media context?

2 Theoretical Background

2.1 The evolution of the Tourist Gaze

Urry (1990) defined the tourist gaze as a culturally structured way of looking, shaped by institutional visual narratives. In this formulation, tourists travelled to consume the images they had already encountered, embedding tourism within a regime of visual expectations (Canavan, 2020). The rise of digital technologies challenged this definition, reconfiguring it as a more "performative practice" (Urry & Larsen, 2011), underscoring its multi-sensuous nature (Perkins & Thorns, 2001) and emphasizing tourists' active role in its creation and dissemination (Robinson, 2014) through UGC. Building on this, Dinhopl and Gretzel (2016) argued that UGCs have become a powerful mechanism for social validation. In pursuit of such validation, tourists shift their focus from representing destinations to centering themselves within their visual narratives, most notably through selfies, where the main attraction is the tourist rather than the destination itself. This shift has informed the contemporary Liu et al.'s (2024) concept of "proactive tourist gaze", which encapsulates the actual tourist desire to remain at the center of the experience while actively engaging with others (fellow tourists and/or residents). This novel theorization aligns with Canavan's (2020) idea that tourism is increasingly motivated by aspirations of identity construction and visibility. Taken together, these developments highlight the tourist gaze as dynamic in nature, shaped also by digital technologies (Liu et al., 2024), while actively reshaping the tourism experience. Yet, as digital engagement deepens within increasingly interactive and agentic platforms, Larsen (2024) has introduced the concept of the "digital gaze" to capture the influence of new digital and immersive technologies on tourist outlooks. However, this concept and the motivations underpinning its enactment remain largely underexplored, despite the rapid growth of platforms such as video games, which are already being embraced by tourists as sources of travel inspiration and experiential engagement. Video games represent a

unique context: although institutionally produced, their affordances enable tourists to experience them in performative or proactive fashions. As such, they may give rise to a tourist gaze that is institutional, performative, proactive, or an unprecedented coalescence of these forms.

2.2 Video games and tourism

The video game industry has experienced remarkable growth in recent years with projections set to reach over one hundred billion dollars in revenues by 2026 (Statista, 2024). This rapid expansion has attracted significant interest from various sectors, including tourism. Tourism research has predominantly examined gamification as a tool for enhancing tourist experiences (Huang et al., 2013; Wei et al., 2023; Xin et al., 2022), promoting cultural sites (Nylund et al., 2021; Mochocki, 2021; Duarte et al., 2021; Bonacini et al., 2021), and facilitating learning about cultural heritage (Camps-Ortueta et al., 2021). However, a more recent stream of research has investigated if and how video games can inspire actual travel to the locations represented in-game (Dubois & Gibbs, 2017; Molesworth, 2009; Wei et al., 2023; Zhang et al., 2024). In this debate, the most recent work of Sharma et al. (2023) demonstrates that realistic renderings of destinations, when coupled with emotional connections fostered through players' interactions in video games play a significant role in shaping destination images that then trigger real tourism experiences. Despite these recent discussions emphasizing the capacity of video games to construct destination image, and the growing importance of these digital and participatory environments within the industry, little attention has been given to examining how such destination images shape the nature of the tourist gaze and the relative consequent motivations.

3 Context & Method

The research context for this study consists of real-world, multiplayer racing video games—specifically Forza Horizon 4, Forza Horizon 5, Gran Turismo 7, and Test Drive Unlimited Solar Crown. These titles were selected because their sociotechnical affordances position them as environments in which the traditional, institutionalized tourist gaze and the more recent proactive tourist gaze may intersect, potentially giving rise to a novel touristic outlook. Crucially, these games are not conceived as destination-focused products, nor were they designed with destination exploration as their primary purpose. Investigating how tourist-like gazes emerge within these contexts therefore offers a unique opportunity to demonstrate the powerful role that video games—even those not explicitly oriented toward tourism—can play in shaping tourism-like experiences, imaginaries, and practices. Furthermore, the longstanding popularity of these franchises has cultivated loyal and active player communities that engage in rich, sustained discussions on digital platforms. These conversations frequently address the representation of real-world destinations within the games, the extent to which these virtual environments inspire or influence physical travel, and the types of exploratory, mobility-based practices enacted in gameplay. Taken together, these elements position

racing video games as fertile and revealing settings for examining how tourism-related gazes and experiences can be formed, negotiated, and amplified beyond traditional tourism spaces. Given the digital and participatory nature of these games and the predominance of related discussions on social media, we conducted an interactive netnography (Kozinets, 2020). We began by collecting archival materials and then immersed ourselves in the digital traces surrounding these games on Reddit, YouTube, and TikTok, the platforms most frequently used by players to discuss racing video games (according to Statista report "Gaming Community Platform Usage 2022–2024"). To identify relevant traces, we developed a comprehensive set of hashtags and keywords derived from the archival analysis ("Forza Horizon 4," "Forza Horizon 5," "Gran Turismo 7," "Test Drive Unlimited Solar Crown," #racingvideogames, "SIM racing video games"). Throughout the immersion, we kept detailed immersive journals to systematically monitor content collection and ensure data integration. Lastly, to deepen our understanding of how players navigate and experience destinations in these digital contexts, we conducted an interactive phase involving 62 hours of immersive gameplay and 12 in-depth interviews with players, influencers, and gaming-session participants. The preliminary dataset includes 345 online traces (videos, comments, and discussions) and 50 archival sources. Even if all the online traces were publicly available, in our findings, we decided to obscure the name of the posters as well as to cloak their most sensitive and private stories shared in the comments, using AI-based techniques (Kozinets, 2020). We did the same with our interviews: we anonymized the interviewee and cloaked their answers through Chat GPT. This approach ensured that while identifying elements were removed, the original meaning, context, and emotional depth of the narratives remained. For the analysis, we conducted a triangulation of these data, which allowed us to identify conversational patterns and generate a hermeneutic cycle that enriched the interpretive process. This cycle enabled a continuous dialogue between data and theory, drawing on the conceptual constructs of the tourist gaze that informed our coding approach, which combined both inductive and deductive procedures.

4 Findings

The available evidence shows that the realism of in-game locations in racing video games evokes powerful feelings of destination recognition, unfolding across three experiential pathways: (a) in-game-to-physical recognition – identifying a real destination previously seen in the game; (b) physical-to-in-game recognition – recognizing an in-game destination already visited physically; and (c) in-game-to-in-game recognition – recognizing a location encountered multiple times within the game. Across these pathways, players articulate motivations for destination gaze, enacted through specific practices, encompassing both physical settings and virtual environments.

4.1 In-game to physical-recognition

The realism with which in-game destinations are rendered generates "in-game-to- physical recognition", which motivates players to further explore the physical destination reported in their games. To visit this physical destination, players often begin by meticulously planning their visits specifically to the sites first encountered in- game. The planning assumes a digital cartographic form as players cross-reference in- game labels with Google Maps and Google Earth. Once in the destination, players visit the specific, previously mapped, game-sites as a way that brings to life the affective texture of the in-game world; as said by Giulia (a fictional name, as in the following cases): "For me, gaming is a siding life. So, seeing Edinburgh in real life was a way [to] live, for the first time, the game place on my skin". Parallel to this, players map and visit these game sites to assess the detail and fidelity of the game's depiction. This motivation manifests in the enactment of a distinctive photographic practice that has become increasingly widespread among players. Once at the specific location previously seen in the game, players capture an image of the site and juxtapose it with the equivalent in-game screenshot, meticulously replicating angles and framing as shown in the Reddit post in Figure 1. For players, verifying this authenticity is a fundamental condition of immersion in game-play. Interviews reveal that players often cannot fully surrender to the experiential intensity of gameplay until they are assured that the spaces traversed virtually are anchored in actual geographies, as Luca recounted: "I did this photo because in the game, I cannot fully relax and enjoy the views of what I see because I don't know if in real life these landmarks or biomes are the same. But the first time I saw one of these photos they finally liberated me".

4.2 Physical-to-in-game recognition and in-game-to-in-game recognition

The realism with which in-game destinations are rendered can generate "physical-to-in-game recognition" and "in-game-to-in-game recognition". They both emerge as powerful catalysts for in-game destination exploration, giving rise to a range of distinctive practices through which players engage with virtual environments. The most common practice involves leisurely driving through in-game landscapes without a predetermined destination. Observations during gameplay sessions revealed that such open-ended driving is often punctuated by deliberate pauses to admire scenic elements from the virtual car window or to exit the vehicle and contemplate the landscape from a static viewpoint. These practices are often described as stress-relieving, offering a sense of catharsis comparable to real-world drives. As one Reddit user shared: "Forza Horizon is pretty much my go-to game for managing my mental health. There's something about being able to lose yourself in that open world." Importantly, these practices are not always solitary. Players frequently connect with others who share an interest in gazing at in-game destinations and organize collective explorations through features such as seasonal events and the caravan system. Whether solitary or social, these moments of exploration are commonly accompanied by the desire to document the journey. Much like tourists photographing their travels, players use the Photo Mode affordance to capture and share images of their experience (Reddit post in Figure 2). These photos, often

uploaded to the game's web platform, support players to share with others their explorations: "sometimes I show my bros that I don't only race, I also cruise around in wonderful places with big cars."

Fig. 12. UGC checking a real location against the in-game one

Fig. 2. UGC of a game play

5 Discussion: the new types of digital tourist gaze

This study shows that the realism of destination games generates three experiential pathways of recognition that, in-turn, give rise to new configurations of the digital tourist gaze. In-game-to-physical recognition produces a gaze directed toward real- world destinations, where tourists approach physical sites with expectations already shaped through gameplay. This dynamic recalls Urry's (1990) institutionalized tourist gaze, yet here institutional mediation is digitally reconfigured: destinations are co- constructed by developers and DMOs, while meaning-making unfolds through participatory practices such as UGC. Within this hybrid form, however, the destination regains its centrality as the primary object of attention. This repositioning stems from the motivations underpinning this gaze, which involve the embodiment of the gaming experience, achievable only by visiting the actual site, and the validation of the destination as a means to enhance gameplay enjoyment and inspire others. The destination thus becomes essential to fulfilling these identity-related motivations, which resonate with Canavan's (2020) recognized motivations of tourist gaze: identity extension and social validation. Conversely, physical-to-in-game and in-game-to-in- game recognition foster an in-game tourist gaze more closely aligned with the proactive gaze (Liu et al., 2024), wherein players perform exploration, self-presentation, and sociability within digital environments. Here too, the destination retains visual prominence because it underpins the key motivations driving this gaze, escapism and self-expression, which in this case link to both the motivations recognized by Urry (1990) in the romantic gaze and by Canavan (2020) in celebrity tourist gaze.

Overall, this study extends the theorization of the tourist gaze by identifying the emerging features of the "digital tourist gaze" (Larsen, 2024) that circulates across physical and virtual domains and draws inspiration from multiple gazing practices. Digital tourism gaze, particularly for the in-game experiences has similarities from gazes recognized from virtual reality experiences (Tussyadiah et al., 2018) because it encourages a self-directed exploration of virtual places and because generates the same sense of presence of people inside the virtual destination. However, the intrinsic motivations

that it solicits are related to identity work and not to destination preview. It also advances video game tourism research by demonstrating how game-generated destination images not only inspire physical travel but also sustain enduring forms of virtual tourism and identity work. While this study represents a meaningful first step toward a deeper understanding of the phenomenon, its scope is limited to racing video games. Future research could extend the investigation of the tourist gaze to other game genres, which may elicit different forms of touristic looking, engagement, and destination meaning-making. Despite this limitation, the study offers valuable implications for practitioners—particularly destination marketers—who may draw on these insights to more strategically integrate destinations and attractions within video game environments as a means of stimulating curiosity and encouraging eventual physical visitation. Furthermore, the findings suggest opportunities for destination managers to explore partnerships with game developers to co-design virtual representations of destinations and offer in-game visits as premium, purchasable experiences—positioned as complementary "tourism encounters" within the game world. Such collaborations could open new revenue streams while engaging gamers as an emerging and highly influential audience segment.

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Embodiment and Digital Technology: How Tourist Agency Transforms En-Route Spaces

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Abstract. This paper advances embodiment studies in tourism by examining corporeal practices performed during transit through the combined lenses of embodiment and digital mediation. Focusing on in-flight beauty routines, it reveals how regulated travel spaces become arenas where identity, well-being, and agency are negotiated through tourists' bodies and platformed technologies. Methodologically, it integrates Netnography and autoethnography, extending the latter's use within e-tourism to capture real-time, digitally mediated practices. The study reconceptualizes en-route spaces as critical sites of contemporary tourist experience, expanding theoretical understandings of mobility and agency in the intersection between embodiment and digital mediation.

Keywords: En-route tourism, Embodiment, Tourist agency, Digital platforms, Social media, In-flight experience

1 Introduction

The concept of embodiment in tourism has gained increasing attention as scholars recognize the body's central role in shaping lived experiences and spatial engagements (Veijola and Jokinen, 1994; Crouch and Desforges, 2003; Yang, 2025). Once considered peripheral, the body is now understood as the very site where tourism is produced, negotiated, and performed. Everyday actions such as walking, resting, or interacting are embodied practices shaped by power, affect, and market forces. This shift has reframed tourism as a deeply corporeal and relational activity, where sensory and performative engagements mediate how spaces are experienced.

Recent research highlights that embodiment operates within structured and ideologically charged tourism spaces (Yang, 2025), where tourists adapt, negotiate, or resist expectations through bodily practices. Such dynamics are particularly visible in highly standardized environments such as airplanes, airports, or hotels (Germann Molz and Buda, 2022). Here, embodiment becomes tangible, revealing how tourists conform to or subvert disciplinary scripts.

Technological mediation further reshapes embodiment. Digital platforms extend corporeal engagement across all phases of travel, transforming even transitional "en-route" spaces—traditionally seen as functional—into sites of experience (Zach and

Gretzel, 2012), increasingly influenced by social media and influencer content (Gretzel, 2017). This evolution marks the emergence of a digitally empowered tourist whose agency is enacted through the body (Yang, 2025).

Yet, while the embodied turn has advanced tourism theory, en-route contexts remain underexplored. Tourism scholarship continues to privilege destination-based experiences, neglecting the performative, affective, and disciplinary negotiations that occur in transit. This paper argues that en-route spaces—airplanes, airports, and trains—offer a revealing setting for examining embodiment. Their disciplinary nature concentrates tensions between restriction and agency, making them fertile grounds for understanding how tourists appropriate and reconfigure mobility. Digital media further intensify these dynamics, rendering bodily practices visible, replicable, and shareable. What once were private routines, such as self-care or bodily adjustment, now circulate as collective repertoires on social platforms, transforming mobility into a performative field of negotiation and self-expression.

Against this backdrop, this study examines how the interplay between bodies, en-route spaces, and digital technologies reshapes tourist agency. It explores how tourists use embodied and digitally mediated practices to negotiate constraint, perform identity, and transform regulated environments into spaces of self-expression.

2 Embodiment and the reconfiguration of en-route tourist spaces

Tourism research has progressively emphasized the body as an active mediator of experience, moving beyond earlier views of passivity to highlight its performative and relational role (Veijola and Jokinen, 1994; Crouch and Desforges, 2003; Small et al., 2012; Everingham et al., 2021). The body is not only an instrument of mobility but a site where meanings are produced, negotiated, and performed. Yang (2025) synthesizes this embodied turn through two key notions—embodied agency and tourism space—which reveal experience as a co-constitution of body and environment. Spaces are thus dynamic constructs shaped by bodily interaction and power (Crouch et al., 2001; Edensor, 2001). Yang (2025) identifies four interrelated dimensions—performative, experiential, ideological, and disciplinary—that explain how tourists sense, act, and negotiate within structured environments, making embodiment a key entry point for understanding agency.

These dynamics are especially evident in en-route spaces, once considered neutral passages (Denstadli and Jacobsen, 2011; Zach and Gretzel, 2012) but now recognized as socially charged contexts governed by surveillance, affect, and regulation (Sheller and Urry, 2006; Germann Molz and Buda, 2022). Even simple acts such as sitting, eating, or self-care gain new meanings under spatial restriction (Adey, 2003; Edensor, 2001), becoming gestures through which travelers negotiate comfort, identity, and visibility. Digital technologies further extend embodiment, turning transitional time into aesthetic and communicative practice. Platforms like TikTok and Instagram mediate how bodies are displayed and interpreted (Munar and Jacobsen, 2014; Gretzel, 2017; Polat et al., 2024), with influencers shaping repertoires of gestures and emotions that

circulate among travelers. Tourists thus emerge as both consumers and producers of embodied meaning (Gretzel et al., 2015), transforming mobility into a performative field where corporeal and digital practices intertwine. These intersections reveal how en-route environments, though restrictive, become fertile sites for observing how bodies and platforms co-produce new forms of agency and presence in contemporary tourism.

3 Methodology

This study examines en-route beauty routines, particularly in-flight skincare, as a context where embodiment, space, and techno-social mediation intersect to reconfigure tourist agency. These practices, popularized by influencers and widely shared online, transform regulated environments like airplanes into stages of self-care and visibility (Murden, 2024), illustrating how travelers convert restrictive spaces into temporary zones of comfort and continuity through bodily gestures that manage the physical and emotional demands of mobility. To analyze this phenomenon, we combined netnographic (Kozinets, 2020) and autoethnographic (Chang, 2016) approaches. Netnography is particularly suited to contemporary tourism because travel is increasingly mediated by platforms, enacted in real time, and leaves dense digital traces; it allows us to follow how practices emerge, circulate, and gain legitimacy while remaining attentive to their embodied contexts (Kozinets and Gretzel, 2024). Between November 2024 and September 2025, we conducted multimodal immersion in content related to #inflightbeautyroutine across Instagram, TikTok, Pinterest, YouTube, Reddit, and Spotify, tracing its evolution. The dataset included screenshots, short videos, and podcast transcripts featuring tourists, influencers, and observers, complemented by the performance of selected in-flight routines during multiple flights, which we documented through field notes and photographs. This integration provided first-hand insights into corporeal and sensory dynamics, social exposure, and audience reactions. The analysis drew on recent systematizations of embodiment theories that view corporeality as a dynamic intersection of practice, affect, and regulation (Yang, 2025). Rather than fixed dimensions, these were treated as overlapping orientations revealing how tourists engage sensorially and emotionally with mobility, negotiate identity under constraint, and respond to cultural and social norms that regulate behavior. We also foregrounded affective intensities—such as boredom, anxiety, and comfort—and the role of communicative practices and mobile devices in shaping affective atmospheres during transit (Bissell, 2010), showing how embodied practices in transit are both constrained and reconfigured through socio-digital entanglements. All analyzed content was publicly available, with user identifiers anonymized in accordance with institutional research ethics.

4 Results

Initial findings indicate that tourists mobilize bodily gestures and digital mediation as means of reconfiguring the aircraft cabin into a site of comfort, control, and performative agency. Tourists position their smartphones on tray tables or windows, watch content tagged #inflightbeautyroutine, and replicate micro-gestures while recording themselves, turning the device into both mirror and mediator that frames the body and converts the seat into a performative stage (Melumad and Pham, 2020). Through actions such as disinfecting surfaces, arranging beauty products, and applying skincare masks, travelers reorganize the confined environment into a personalized "comfort bubble." These tactile and sensorial gestures—touch, smell, rhythm—help regulate emotions and restore familiarity, showing multisensory experience and its role in shaping affective responses (Zha et al., 2025). Objects like sanitizers, sheet masks, and lip balm carry both practical and symbolic value, signaling self-discipline and aesthetic control. The routines follow a measured rhythm of cleaning, moisturizing, masking, and documenting, often beginning at cruising altitude or extending into lavatory moments to create continuity within a restricted setting. Facial expressions range from pleasure to anxiety, and captions such as "you think I'm just doing skincare, but this is therapy 30,000 feet above the ground" highlight how these practices act as both performance and coping. En-route beauty routines thus operate as micro-rituals through which travelers reclaim autonomy and emotional regulation within the constraints of transit.

These performances also reveal the tensions between self-expression and social regulation. Passengers and online audiences often respond with discomfort or ridicule, reinforcing norms of privacy, discretion, and safety. Observations captured in situ show disapproving looks and comments such as "what is he doing? can't they do that at home?", reflecting the clash between digital aesthetics and shared behavioral expectations. Online, similar criticisms accuse travelers of invading others' privacy or breaching decorum, particularly when recordings include crew or nearby passengers, while others frame actions like closing window shades or spraying mists as safety violations and moral irresponsibility ("for doing your damn crazy skincare you're exposing others to risks"). Yet rather than abandoning these routines, travelers adapt them to reduce disturbance—zooming in on their faces, whispering narration, avoiding sprays, and substituting creams or serums. These adjustments show an iterative negotiation in which bodily practices are recalibrated in response to both physical co-presence and digital scrutiny. Over time, such performances have been normalized and even valorized as models of mindful and aesthetic self-care suited to public travel environments. Through this process, tourists transform surveillance and restriction into opportunities for creative adaptation, turning en-route spaces into laboratories of embodied negotiation and agency.

5 Conclusion

This study advances embodiment theory in tourism by showing how digital technologies act not only as mediators but as constitutive agents of en-route experience. While

previous research emphasized the interaction between body and space (Crouch and Desforges, 2003; Yang, 2025), our findings reveal that social media and mobile devices extend and transform embodied practices, making them visible, replicable, and socially validated. Through digital mediation, travelers convert restrictive transit environments into expressive and affective spaces, negotiating control, comfort, and identity. Platforms such as TikTok and Instagram provide performative scripts that normalize self-care and aesthetic discipline, while also amplifying surveillance and self-regulation. Thus, en-route spaces become arenas where tourists continuously recalibrate behavior under both physical and digital gaze, enacting new forms of agency and belonging. These practices also redefine service experience: comfort and satisfaction emerge not solely from material conditions (Poon and Ho, 2021) but from the capacity to curate and share embodied routines that align with personal and social meaning. Ultimately, the digitally mediated tourist embodies a shift toward continuous, platform-embedded mobility in which bodies, spaces, and technologies co-produce experience, transforming travel from a passage between destinations into an ongoing performance of care, identity, and presence.

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Short-Form Video Narratives and Their Impact on Heritage Tourism Among Generation Z

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Abstract. This study examines how user-generated content (UGC) on TikTok influences Generation Z's motivation to visit UNESCO World Heritage Sites (WHS). A mixed-methods approach combining text, content, and engagement analysis was used to explore how short-form videos shape destination image and digital engagement. Using KH Coder, a quantitative text analysis identified key terms and co-occurrence patterns in video captions. The preliminary results suggest that users emphasise destination, architectural, and aesthetic attributes, reflecting both visual appreciation and the influence of TikTok's algorithmic dynamics. These findings provide initial evidence of how TikTok contributes to the creation of cultural tourism narratives and engagement among younger audiences.

Keywords: Short-form video, Heritage tourism, Generation Z.

1 Introduction

Over the years, social media has become a significant influence on how tourists perceive destinations, seek information, and make travel-related decisions. The impact of electronic word-of-mouth (e-WOM) on travel behaviour has been extensively researched, emphasising its ability to shape perceptions and intentions (1). Social media platforms allow users to access, create, and share travel experiences, transforming traditional communication between destinations and tourists (2). In this context, user-generated content (UGC) has become a key influence on destination image and decision-making (3). Perceived as more trustworthy and emotionally engaging than conventional promotional materials due to its authenticity and peer-based origin, UGC influences both cognitive and affective evaluations of destinations, encouraging trust and emotional connection (4).

The growth of user-driven social media has transformed tourism communication. Destination marketing organisations (DMOs) increasingly integrate UGC to engage audiences and remain relevant in digital environments (5). This shift creates challenges of authenticity and sustainability, but also opportunities to understand how users interact with UNESCO World Heritage Sites (WHS), as engagement evolves from passive observation to active participation in shaping cultural meaning (6).

Recently, social media consumption has shifted from static images to short-form video content, with TikTok leading this transformation and redefining how destinations are presented online (7). Its design prioritises brevity, creativity and interactivity, enabling users to produce and share content easily (8). Short-form videos are now the most consumed format worldwide, valued for their immediacy, emotional appeal, and algorithmic reach, which make them effective tools for promoting destinations (9).

TikTok's UGC videos combine creativity and emotion, influencing destination images and inspiring travel decisions (10). Its engagement-based algorithm amplifies content visibility, encouraging users to share experiences that collectively contribute to digital representations of heritage (11). The platform is particularly relevant for Generation Z (Gen Z), who rely on social media for discovery, self-expression, and social validation (12).

According to recent global data (13), users aged between 18 and 24 represent approximately 23.6% of TikTok's total audience, while those aged between 25 and 34 represent around 29.9%. Collectively, these groups, which largely correspond to Gen Z and younger Millennials, constitute more than half of the platform's active user base.

As TikTok's most active users, they consume travel content to obtain information, build identity, and share a sense of belonging (14). Their preference for short and authentic videos influences how destinations are perceived and chosen, positioning TikTok as a space where user participation shapes travel aspirations and emotional connections with WHS (10).

Despite the growing importance of e-WOM in tourism, most studies focus on platforms like Instagram, overlooking TikTok's short-form and viral dynamics. Limited research has applied video analytics in tourism (7), and there is limited empirical evidence on how TikTok's UGC shapes perceptions and motivations to visit UNESCO WHS. This study addresses this gap by examining how TikTok content influences Gen Z's travel motivations and perceptions.

2 Methodology

This study adopts a mixed-methods approach to analyse UGC on TikTok and its influence on Gen Z's motivation to visit UNESCO WHS. The research integrates video analytics, content and sentiment analysis to identify how digital narratives represent heritage and engage with younger audiences.

The case study focuses on La Sagrada Familia for its symbolic value, architectural uniqueness, and strong presence on social media, which make it an appropriate case for analysing how TikTok content contributes to the construction of digital destination image and travel motivation among younger users.

Data were collected using APIFY's TikTok hashtag scraper following the same methodology as Marti-Ochoa (7), targeting #lasagradafamilia, #sagradafamilia, and #sagradafamiliabarcelona. The dataset initially contained 1,552 videos; after removing duplicates, 913 unique videos remained, of which 328 in English were kept for analysis.

After data collection, cleaning, and pre-processing, an intercoder validation process was applied, combining human review and AI-powered tools to ensure that the videos were directly related to La Sagrada Família and to support their content classification.

A quantitative text analysis was carried out using KH Coder, focusing on the captions of the selected TikTok videos. Following the methodology described by Medina-Hernandez (15), the data were pre-processed to enable data-mining techniques. A list of stop words was created and introduced to the software to remove non-significant terms. The analysis included a keyword frequency analysis, which identified the most recurrent words and their relative frequency across the dataset, and a co-occurrence network, which visualised relationships among frequently used terms.

In a subsequent stage, a content analysis will be conducted to examine the characteristics of UGC (16). The classification will follow a deductive–inductive approach: deductively, based on validated variables from previous studies (17), and inductively, through direct observation of the videos to identify emerging patterns. This stage will focus on UGC videos, categorised by type, format, and engagement metrics to determine which kinds of content generate the highest levels of interaction among Gen Z.

To assess user interaction, the study will apply an engagement rate, following previous research on short-form video metrics (18). Engagement rate will be calculated as the proportion of interactive actions, *likes, comments, shares* and *saves* relative to total *views*, allowing consistent comparison across TikTok videos:

$$Engagement\ rate = \frac{(\text{likes}+\text{comments}+\text{shares}+\text{saves})}{\text{views}} \times 100 \quad (1)$$

3 Preliminary Results

Quantitative text content analysis of TikTok captions about La Sagrada Familia revealed that the most frequent keywords relate to the destination itself, architectural or religious references, and attributes (see Table 3). Terms such as “Barcelona,” “Spain,” and “Sagrada_Familia” highlight the geographical focus of the content, while “Gaudi,” “architecture,” “cathedral,” and “basilica” emphasise its architectural and symbolic significance. Words like “beautiful” and “best” reflect users’ attributes, whereas “viral” and “trend” suggest the influence of TikTok’s algorithmic visibility.

Table 4. The top twenty-five most frequent keywords in the entire dataset.

Rank	Keyword	Count	Density (%)	Rank	Keyword	Count	Density (%)
1	Barcelona	391	4,09	14	best	25	0,26
2	Spain	226	2,36	15	view	23	0,24
3	Sagrada_Familia	184	1,92	16	viral	23	0,24
4	fyp	144	1,51	17	beautiful	22	0,23
5	Gaudi	98	1,02	18	year	22	0,23
6	travel	70	0,73	19	building	20	0,21
7	visit	41	0,43	20	world	20	0,21
8	church	40	0,42	21	just	19	0,2
9	architecture	33	0,35	22	time	19	0,2
10	europe	32	0,33	23	tower	19	0,2
11	barcelonatiktok	29	0,3	24	make	17	0,18
12	basilica	28	0,29	25	trend	27	0,28
13	cathedral	26	0,27				

Source: Authors' own.

The co-occurrence network (see Fig. 1) shows clusters linking architectural and cultural terms with those referring to platform dynamics, such as "fyp" and "viral." A smaller node connecting "video" and "escalator" illustrates specific viral trends on the platform.

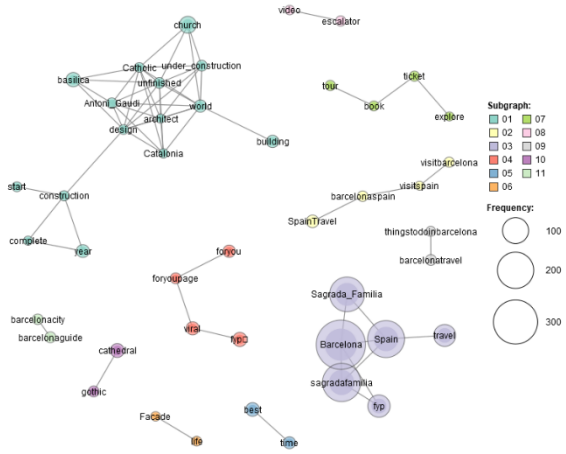

Fig. 13. Co-occurrence network of words (Source: Authors' own elaboration using KH Coder).

The quantitative text content analysis showed that TikTok captions about La Sagrada Familia tend to emphasise the destination itself, as well as its architectural, religious, and aesthetic attributes, while also reflecting the influence of the platform's algorithmic dynamics. These findings provide an initial insight into how users describe and contextualise cultural heritage through short-form video captions.

As part of the next analytical phase of this mixed-methods study, sentiment analysis of user comments, content typology classification and engagement metrics will be incorporated. This extended approach will enable a more in-depth exploration of the dynamics of interaction and emotional discourse on TikTok, improving our understanding of how UGC influences the perceptions, motivations and digital engagement of Gen Z with UNESCO WHS. Future research will include a comparative study between La Sagrada Familia and another UNESCO WHS, such as Cologne Cathedral in Germany, in order to identify common patterns in the digital storytelling and narratives of each site, shaped by cultural, architectural, and contextual differences.

Acknowledgements.
This research is supported by the Spanish Ministry of Science and Innovation MCIN/AEI/10.13039/501100011033/FEDER, UE within the RevTour project (Ref: PID2022-138564OA-I00) and the AGAUR-FI Joan Oró pre-doctoral program (2024 FI-3 00359) of the Generalitat de Catalunya and the European Social Fund Plus.

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Smart Destinations & Data-Driven Tourism Governance

A Territorial Justice Framework for AI and Residents Inclusion in Tourism Destinations

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Abstract. Artificial Intelligence (AI) and Generative AI (GAI) are transforming tourism, yet their implementation raises critical ethical concerns related to privacy, inclusivity, and cultural preservation. Although AI has the potential to enhance Smart Tourism Destinations (STDs), current approaches often overlook residents' experiences and reinforce social inequalities. This study underscores the urgent need to integrate local communities into AI-driven tourism governance. Based on a literature review and basic bibliometric analysis on tourism destinations and AI/GAI, this conceptual framework study identifies three priority areas for future work: incorporating residents' voices, adopting qualitative and mixed-method approaches, and developing ethical frameworks. The findings reveal the absence of a clear roadmap for responsible AI/GAI adoption in tourism—an essential gap to address in order to ensure fair, inclusive, and sustainable development.

Keywords: AI, GAI, tourism destination, resident, justice.

1 Background

Artificial intelligence (AI) and Generative Artificial Intelligence (GAI) are reshaping hospitality and tourism organizations and, consequently, visitors and residents interactions with destinations, routes and services. This reshaping is inevitable and staggeringly fast [1] [2]; and ethical considerations—inclusiveness, data privacy, and cultural preservation—are becoming crucial.

Furthermore, there is real potential in how tourism destinations, through the implementation of AI/GAI can support sustainable development and growth, but technology is not neutral [3], and there are relevant potential negative impacts. Current destination tourism research mainly emphasizes the role of tourists, forgetting residents' quality of life and wellbeing [4]. AI/GAI models are trained on a vast amount of data, and any bias (implicit and explicit) within the data or lack of data (such as the exclusion of resident's voice) can lead and reinforce bias and lack of inclusivity [5] [6]. Finally, access to technology is a barrier for certain vulnerable groups [3], organizations, and tourism destinations routes; and this is only the tip of the iceberg.

This lack of neutrality is developed in an industry, tourism, that has been generally acknowledged to have the potential to contribute to just forms of development, increasing self-esteem and capabilities of indigenous groups, involving community and empowering individuals [9]. A contradictory statement in a context experiencing the dominance of neo-liberal growth policies and the industry's narrow focus on commercial dimensions, and economic growth.

This approach has resulted in increasing claims of injustice and tourismphobia that serve to threaten the long-term sustainability and growth of the tourism sector [8]. Tourism destination governance needs to ensure that technology (AI/GAI) is used in a responsible, ethical, equitable and just way [2], through responsibility, solidarity and advocacy [10], so that it can support a sustainable and just growth and development, that fights against the negative impact of tourism in the territory.

By identifying key questions that must be addressed to incorporate residents' experiences, needs, and perspectives into AI-driven tourism strategies, this conceptual framework study advances the exploration of justice frameworks capable of fostering more equitable and balanced AI-powered tourism development. The paper adopts a qualitative, theoretical-building approach based on an integrative review of the existing literature and initial bibliometric analysis on AI/GAI and tourism destinations, demonstrating how a justice-oriented framework can illuminate critical gaps in current research on the implementation of AI and GAI in tourism contexts.

2 AI/GAI blind implementation and research towards residents

AI/GAI are becoming core tools in the development of smart and sustainable tourism destinations. Destinations such as Barcelona and Amsterdam use predictive analytics to anticipate overcrowding. Venice and Dubrovnik employ computer-vision tools to monitor congestion in real time, while cities like Singapore adjust public transport using AI-based mobility optimization. Madrid or New York also use AI to monitor short-term rentals and support housing policies.

But residents' blind AI/GAI implementation and research can potentially be incomplete, irrelevant and reinforce an approach to non-inclusive destination management. This approach can potentially reinforce tourismphobia and limit the development of sustainable destinations, as Smart Tourism Destinations (STDs) become biased towards visitors, forgetting residents, among other vulnerable groups.

This study conducts a basic bibliometric analysis based on Scopus, using the following search string: TITLE-ABS-KEY (tourism OR tourist destination) AND TITLE-ABS-KEY (artificial intelligence OR AI OR 'generative AI'). The search yielded 247 articles, with a date cutoff of June 1st, 2025. The purpose of this analysis is to understand to what extent are residents being considered in current research on tourism and AI/GAI. By identifying the presence—or near absence—of residents in this body of literature, the study exposes a critical gap that has profound implications for justice, governance, and the ethical implementation of AI in tourism destinations.

The articles identified as incorporating residents (6 articles) in the implementation of AI /GAI in tourism destinations show that the STDs are the main framework to integrate

residents and visitors. According to [11] the definition of STDs explicitly includes residents, as these destinations rely on advanced technologies not only to enhance tourist experiences but also to promote sustainable development and improve residents' quality of life. Similarly, [12] [13] incorporate residents' perspectives, though with the aim of increasing the destination's appeal to tourists by leveraging social media and notions of authenticity. However, as tourists increasingly enter residential areas in search of authentic experiences [14], tensions arise related to rising housing costs, pressure on transport systems, and increases in the price of goods and services. While smart technologies may help mitigate shared challenges such as overcrowding and mobility [15] [14]), residents and tourists do not share the same needs or priorities. Residents place greater value on environmental and cultural preservation and occupy a much broader spatial range in their daily lives than tourists [16]. Contradictory objectives that are sought in the same territory, tourist destination, city, *polis*.

3 A Justice Framework for the implementation of AI/GAI in tourism destinations

For Aristotle, individuals are social animals and for both Aristotle and Plato the *polis* (city), must ensure personal development of each human being. Aristotle believes that ethics becomes one of the sources of law and he calls "just" the actions that provide or safeguard happiness for the individuals in the community (Aristotle, book V, 1129b). Those who possess justice conduct themselves virtuously with everyone and not only with themselves (Aristotle, book V, 11230b). Other influential classics of political philosophy, where justice becomes a central element are Hobbes, Locke, Rosseau, Kant, Mil, Marx, Habermas and John Rawls [17].

A Rawlsian approach is especially relevant for tourist destinations as it conceives places as containers with sovereign borders, with rights to resources determined by citizenship [18]. For Rawl, justice must incorporate the protection of people's autonomy against any intrusion of higher social purposes

Destination management and marketing organizations often avoid addressing justice-related concerns affecting local communities [19]. Given tourism's deep entanglement with place and people—from local communities to global networks— several scholars highlight the fact that research would benefit from engaging with multi-, inter-, and transdisciplinary approaches to justice [20] [19] [10] [18].

Although in the previous decade we have seen a justice turn, and a significant growth of tourism scholars thinking about these issues [20], they have, however, not been explicitly intersected with discussions on AI at the destination level.

Researchers have already identified several reasons behind that unequal distribution of benefits of technology and AI/GAI among tourist destinations, routes or organizations, that need to be taken into consideration from a justice perspective. Tourism management models based on AI risk reinforcing exclusionary practices, which can intensify tourism-related tensions and undermine sustainability goals. Yet, at the same time, STDs are often presented as a way to balance benefits between tourists and host communities but, in practice, the voices of residents remain marginal in both the design and

implementation of technological solutions. Ensuring their fair and meaningful inclusion — from the initial design phase to final application — is therefore essential to building more inclusive, sustainable, and community-oriented destinations.

According to [18] the following principles and topics are emerging in tourism studies in relation to justice: social justice, equity and rights; inclusiveness and recognition; sustainability and conservation; well-being, belonging and capabilities, post-humanistic justice and; governance and participation. All stakeholders must embrace affirmative ethics, acting with political responsibility in relations to the vulnerable and disempowered, including the following parameters: responsibility, solidarity and advocacy [10].

Based on these principles, we propose a future research agenda structured around three core areas: a) tourism destinations and local communities/residents, b) methodological approaches, and c) ethical frameworks.

Several authors [21] [22] justify the need to incorporate local communities / residents, through a more systematic integration of their experiences, needs, and expectations into AI systems used in tourism. Future research should also examine the broader consequences of excluding residents — including social displacement, economic inequality, and cultural erosion — and explore the institutional, technical, political, and economic barriers that continue to hinder their participation in decision-making processes. Future studies should explore how AI can incorporate residents' perspectives, needs, and lived experiences. This includes examining: To what extent current AI systems integrate residents' voices; the social and economic consequences of exclusion; institutional and technical barriers to resident participation; policy mechanisms needed for just implementation; case studies of successful resident inclusion; how residents can remain represented in evolving AI systems and; long-term social and spatial implications of AI adoption. Addressing these questions requires participatory design, community-based research, and territorial impact assessments that position residents as legitimate knowledge-holders.

Regarding research methods and AI/GAI, while quantitative approaches dominate, they often fail to capture the complexity of local contexts. Qualitative methods — such as ethnography, immersive netnography, or in-depth case studies — can provide critical insights into how residents perceive and respond to technological change. These methods offer a more nuanced understanding of emotions, narratives, and power relations that are typically invisible in big data. Mixed-method designs, combining the strengths of both qualitative and quantitative approaches, should be encouraged to ensure a more holistic and grounded understanding of tourism dynamics. In addition, future studies would benefit from a stronger focus on longitudinal analysis. Longitudinal studies are therefore essential to capture evolving dynamics, track shifts in community attitudes, and assess the real-world sustainability of AI-based interventions. Given that dominant research [2] [22] relies on quantitative models, future work should employ: Ethnography, immersive netnography, and in-depth case studies; mixed method designs and; longitudinal approaches to capture evolving community attitudes. These methods can reveal emotions, narratives, and power dynamics invisible in big data.

Finally, AI/GAI brings notable ethical challenges: privacy, data protection, transparency, and potential biases. A third area — which remains to be developed - focuses on

ethical approaches and the principles needed to guide the just integration of AI in tourism planning and governance. Ethical principles and user-focused design should be a priority when creating AI solutions. Trust dynamics act as a key link between users and technology. As such, research must also address the ethical risks of AI at the destination level, focusing on [21] [22]: Privacy, data protection, and transparency; residents' willingness to engage with AI systems; trust dynamics between humans and intelligent systems and; the role of ethical principles in tourism governance

This requires frameworks that embed responsibility, solidarity, and advocacy into AI development and use.

4 Conclusions

While AI and GAI are rapidly reshaping tourism governance, current research largely overlooks residents, who are essential territorial stakeholders. This study explores how AI/GAI can be applied to the governance of tourism destinations, with special attention to their effects on resident inclusion, ethics, and sustainable development. Because technology is not neutral, AI systems designed without resident input may amplify inequalities rather than support just and balanced destinations. To address this, we propose a justice-based framework rooted in ethical, philosophical, and territorial principles, arguing that AI must be developed with responsibility, solidarity, and advocacy.

We outline three key areas for future research: (1) integrating residents' experiences and rights in AI design and governance; (2) expanding methodological approaches beyond quantitative models; and (3) establishing ethical frameworks that address privacy, trust, and participation.

A shift is needed—from AI designed for destinations to AI developed with residents—to ensure that technological innovation contributes to fair, inclusive, and sustainable tourism futures. Future research should prioritize the development of a justice roadmap that supports the responsible, strategic, and user-oriented use of AI in the tourism sector.

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Detecting Overtourism Signals through User-Generated Content: A Data-Driven Approach to Tourism Governance

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Abstract. Tourism drives economic and social development worldwide, yet urban destinations like Lisbon face challenges from overtourism, which can negatively affect cities. Traditional statistics capture flows and economic impacts but fail to reflect experiential and perceptual dimensions, limiting timely policy responses. This study leverages user-generated content (UGC) from 143,656 TripAdvisor reviews to detect signals of perceived overtourism. By integrating sentiment, thematic, and spatial analysis, the framework identifies activities experiencing visitor pressure, revealing a paradox of declining overtourism reports despite continued high visitation. Complaints concentrate on public transport and major cultural sites, while dispersed or smaller-scale activities show fewer concerns. The findings highlight a "reporting fatigue" as a perceptual adaptation to congestion and demonstrate the value of UGC for urban tourism management. Future work will incorporate spatial clustering and broader demographic data to enhance the framework's applicability and guide sustainable destination governance.

Keywords: Overtourism; User-Generated Content; Urban Tourism Management.

1 Context and Analytical Framework

Tourism is a key driver of economic and social development worldwide [1]. Lisbon, like other urban destinations, relies on official statistics to guide tourism policies [2], yet these are delayed and lack spatial detail, limiting timely responses to city-scale issues as congestion, seasonality, and visitor dissatisfaction [3].

Overtourism, when tourism intensity or visitor behavior negatively affects residents or visitors [4, 5], is framed as a socio-spatial and perceptual imbalance encompassing physical, ecological, social, economic, psychological, and political dimensions [6, 7]. It emerges from urban planning, mobility, digital consumption, and societal change [8] and manifests as crowding, rising costs, social tension, and loss of authenticity [9].

Traditional statistics capture economic flows but rarely perceptions. To overcome this limitation, recent studies emphasize complementing traditional indicators with data sources that provide timely, spatially granular insights into visitor sentiment [3, 10, 11].

User-generated content (UGC) provides such a lens. Its immediacy and narrative richness allow it to act as a proxy for experiential perception and expectation [12, 13], revealing how visitors interpret urban space and offering emotional and spatial signals of tension between tourism intensity and livability [11].

Building on the data-driven governance perspective that promotes digital indicators to complement official statistics [10], this study integrates sentiment, thematic, and spatial analyses of multilingual UGC to detect patterns of perceived saturation. The approach tests whether combining semantic and spatial dimensions of UGC can serve as an early-warning system for adaptive, perception-sensitive urban tourism management [11, 14].

2 Methodology

This study draws on a corpus of 143,656 TripAdvisor reviews linked to 1,815 attractions (museums, transportation, among other categories) in Lisbon, Portugal, obtained through a web-scraping robot built in Python. The dataset covers the period from January 2023 to June 2025, encompassing the city's tourism resurgence and the associated visitor pressure.

Geolocations were extracted from embedded JSON payloads and, when missing, complemented with calls to the Google Maps API [15].

Reviews were retained only when the date of visit fell within the analysis window. Duplicate attraction pages were merged, and only those verified as lying within Lisbon City Council's borders were preserved and validated by geospatial calculations using shapely and geopandas.

Language detection identified 30 languages, with English representing 89.3 percent of the corpus. Reviews were analyzed in the original language to preserve nuance and thus capture cultural variation.

Sentiment analysis was then applied to each review [16], using a basic prompt to feed the gpt-4o-mini model [17], generating labels as positive, neutral, and negative.

Overtourism detection was carried out through a zero-shot [18], aspect-based prompt [19] using the same gpt-4o-mini model. The classifier was instructed to use an adapted version of the UNWTO definition of the term [7], emphasizing experiential overcrowding and pressure on local life rather than keyword-based recognition. Iterative manual validation refined the prompt to balance sensitivity and precision. The final output assigned a Boolean overtourism flag to each review, independent of its sentiment polarity.

Attractions were subsequently grouped into thematic categories [20], capturing major experiential segments, such as: Cultural & Historical Attractions, Tours, Experiences & Workshops, Food & Drink, and others. Categorization was performed by a language model using attraction names and representative descriptions, under strict rules that prevent overlap. To limit the influence of heavily reviewed operators, each

attraction was capped at 1,000 reviews, with the cap stratified to preserve its overtourism ratio.

2.1 Ethical and Legal Compliance

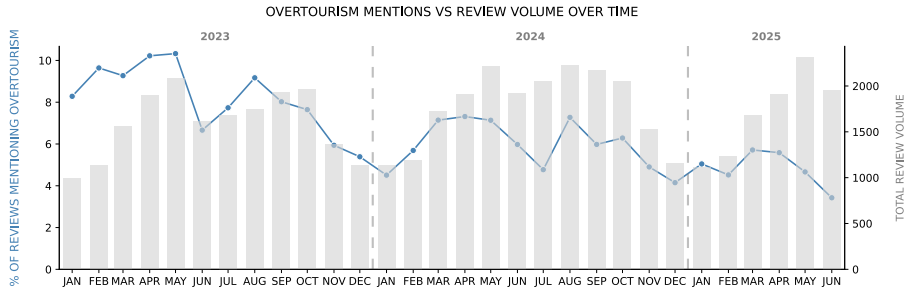
TripAdvisor reviews were lawfully accessed and used solely for non-commercial scientific research as text and data mining (TDM), in accordance with Article 3 of Directive (EU) 2019/790 on copyright and related rights in the Digital Single Market. The authors' institution qualifies as a research organization within the meaning of the Directive. Only non-identifiable content was processed, and all analyses are reported in aggregate. Platform terms of use and the applicability of the TDM exception are discussed, with a preference for licensed APIs in future work. [21]

3 Preliminary Results, Discussion, and Future Research

The resulting time series aggregated by month exposed a paradoxical trend (see Fig. 1): the volume of reviews grows while there is an overall decline in overtourism reports.

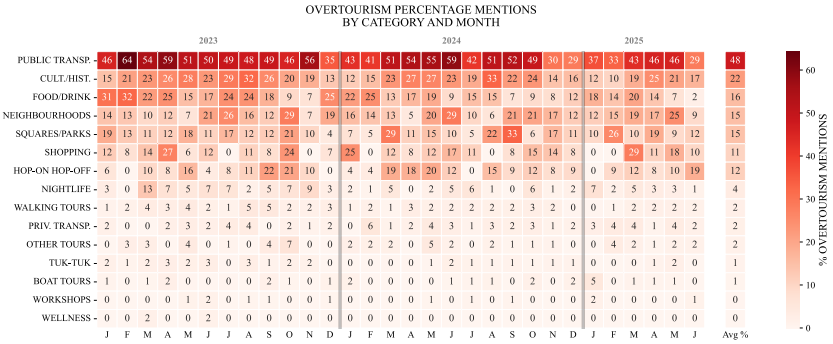
By category, complaints were concentrated on the city's public transport and major cultural or historical sites. At the same time, smaller-scale activities, such as walking tours, experiences, and workshops, received few to no complaints (see Fig. 2).

Fig. 14. The total review volume grows yearly while the overtourism reports decline.



Source: Author's own

Fig. 15. Heatmap showing the evolution of overtourism mentions by category and month.



Source: Author's own

Overtourism thus emerges as primarily an urban issue, reflecting that spatial concentration is a stronger indicator than year-over-year comparisons. The absence of clear temporal or event-based causes for the decline led to the formulation of "reporting fatigue": the progressive normalization of congestion in digital discourse as visitors adapt their expectations or disengage from overtourism rhetoric. These results demonstrate that user-generated content captures some shifts in perception rather than objective visitor density. For destination management organizations [22], these insights can support more responsive governance by identifying where and when perceived pressure arises.

Future research will extend this framework through spatial clustering to identify localized overtourism hotspots within the city [23]. Incorporating additional data sources and demographic perspectives will enhance its generalizability and capture a broader spectrum of visitor experiences. Ultimately, this study contributes to a methodological shift in overtourism research, reframing it as a perceptual and adaptive process rather than a purely quantitative phenomenon, and providing destination managers with a more nuanced, perception-sensitive tool for sustainable urban tour-ism governance [24].

Funding

This work was supported by national funds through FCT (Fundação para a Ciência e a Tecnologia), under the projects: 1) UIDB/04152/2020 (DOI: 10.54499/UIDB/04152/2020) - Centro de Investigação em Gestão de Informação (MagIC)/NOVA IMS), and 2) 2024.07687.IACDC (DOI: https://doi.org/10.54499/2024.07687.IACDC).

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Digital Nudging for Sustainable Behaviour: Evidence from Tourism SMEs

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Abstract. The tourism industry is experiencing a rise in carbon emissions. Given that small and medium-sized enterprises (SMEs) account for 80% of the tourism industry, they are considered to be contributing significantly to this increase. SMEs under resource scarcity have the potential to transform the industry by adopting sustainable practices. One such practice is behavioral economics-based digital nudging. This study involved 33 tourism SMEs in eight countries participating in a client-focused digital nudging projects supported by an EU-funded project. The study aimed to investigate the various digital nudging techniques currently used or planned to be adopted by SMEs and the contextual factors underlying these practices. Data consisted of documents and asynchronous interviews. 15 interviews were completed, and data collection is ongoing. Preliminary analysis revealed that SMEs are implementing digital nudging applications by leveraging nudging techniques, such as automated systems integrated into infrastructure and guest engagement nudges. Furthermore, the preliminary analysis revealed some contextual factors affecting these practices. This study is expected to provide guidance to the industry by providing empirical data on digital nudge practices in SMEs.

Keywords: Digital Nudging, Sustainable Behaviors, Tourism SMEs

1 Introduction

The tourism industry is responsible for 8.8% of global carbon emissions [1]. Given the fact that SMEs hold the biggest share in tourism industry, even if their contribution to entire carbon emissions may seem small, overall, their impact is significant [2]. As tourism industry's environmental impact grows, one of the most important ways to reduce it is, to encourage tourists to nudge in sustainable behaviors [3]. Many accomodation businesses use digital technologies to encourage their guests to engage in sustainable behaviors. A research on nudges for sustainable behavior in the hotel industry demonstrates that simple, non-coercive digital nudges are beneficial and promising in encouraging guest behavior [6]. While the literature is increasingly interested in digital nudges for sustainability [4], [5], there are still remaining gaps in how digital nudges

are used, particularly in the context of SMEs. In this regard, further research on how to adopt these technologies in tourism industry is needed [7].

Nudging, which was initially suggested in the behavioral economics, aims to change individuals' behavior without interfere with their rights [8]. Nudging is not actually presented as a rule, but rather as a behavioral intervention designed to ensure individual and social welfare [9]. In the context of sustainable behaviors in the tourism industry, the positive effects of such nudging practices have been documented, particularly in the areas of energy conservation, food waste reduction, and transportation [10]. In addition, pioneering studies such as downsizing the plate to reduce food waste [11] or reducing towel usage via social norm messages [12] also demonstrate the expected effect of nudging on guest behavior.

With the increasing use of digital technologies, nudging techniques have begun to be used in digital environments. Building on Thaler and Sunstein's [8] nudge theory, Weinmann et al., [13] were the first researchers to lay the foundations of digital nudging. Research conducted to date shows that these digital behavioral interventions, created using information systems, user interface design principles, and behavioral economics nudging philosophy, have the potential to encourage sustainable behavior [5]. A recent study on hotels has also revealed that real-time feedback reduces water consumption [14]. Consequently, it is observed that these digital interventions are being adopted in the tourism and hospitality field, and innovative strategies are being developed to guide guest behavior [5].

This study is being conducted with SMEs that are funded under the Cross-Re-Tour project and are involved in the digital nudging projects. Co-funded by the EU under the COSME program, Cross-Re-Tour has been supporting 87 distinct SMEs from 8 countries. Client nudging holds the largest share in Cross-Re-Tour by showing 88.5%. This study aims to supply the outline of the digital nudging applications in order to nudge the sustainable guest behavior in SMEs in the accommodation sector. The research specifically seeks to answer the following research questions:

RQ1: What digital nudges do SMEs in the hospitality industry design to encourage their guests to adopt sustainable behaviors?

RQ2: What influences tourism SMEs' adoption of digital nudging strategies and their connecting elements?

This study aims to investigate the various digital nudging strategies employed by SMEs and the contextual factors underlying these applications. In this process, it contributes to both the literature and the practices in the industry in many ways from different perspectives. By focusing on SMEs, which represent 80% of the businesses in the tourism industry, it examines the practices implemented by SMEs in the name of sustainability, thereby contributing to the literature. By highlighting the actual operational practices of SMEs, it stands as one of the pioneering studies in the field. Accordingly, this study, covering 33 supported SMEs from 8 EU countries, offers contextual diversity by covering a wide geographical distribution. By determining which contextual factors impact the applications and the types of digital nudges, it exposes the opportunities and limitations. The study's findings are also expected to serve as a guide by providing good examples for tourism SMEs, which are known for their resource constraints.

2 Methodology

An exploratory qualitative research has been designed to answer the research questions. Purposeful sampling was employed in the research. The selection of the SMEs was proceeded in consideration of the active implementation of client-focused digital nudging projects in the context of the Cross-Re-Tour project. Cross-Re-Tour enables SMEs to improve their operational performance by integrating digital, green, and circular economy practices by adapting practices from other sectors. The project also aims to increase the competitiveness of SMEs by promoting twin transition. The participants of the research are 15 managers working in these SMEs. Most of these businesses can be classified as micro-scale, family-run enterprises. The interviews were thematically analyzed using the Nvivo software program and examined with an abductive approach. Thematic analysis is employed in both data-driven inductive approaches and theory-driven deductive approaches, enabling the capture of both manifest and latent underlying concepts [15].

In the Cross-Re-Tour project, a total of 33 SMEs out of 87 SMEs included client-nudging applications in their projects from 8 countries (The Netherlands, Germany, Spain, Montenegro, Malta, Portugal, Slovenia, and Latvia). A brief introduction explaining the study and an interview form (in their own languages) were sent to each of the 33 SMEs. This process was conducted separately in each country by the project partners to eliminate the language barriers and ensure effective communication. This study report is based on 15 asynchronous interviews conducted in two rounds with managers of the accommodation SMEs via e-mail. The current sample comprises 15 SMEs with nine from Latvia, three from Slovenia, two from Portugal and one from Spain. SMEs come in various forms, such as guest houses, vacation homes, rural lodgings, mountain lodges, apartments, bed and breakfasts, campgrounds, and restaurant-camp formats. The number of rooms in SMEs ranges from a 4 room B&B to a 26 room eco-hotel; the largest campground consists of approximately 40 bungalows. Most of these businesses can be classified as micro-scale, family-run enterprises. Additionally, a third follow-up round will be sent to some SMEs to ensure a deeper understanding of the contexts. Asynchronous interviews have helped participants respond in their own languages to avoid from the possibility of misunderstanding in a multilingual context. Secondly, this method allows participants time to think, enabling them to provide more detailed information. In the preliminary analysis, open coding was performed initally. The data were coded independently by the authors using information obtained from the relevant literature and the knowledge collected in the domains of the project. The codes were then cross-checked and discussed until reaching consensus which led to the identification and grouping of indicators. While data collection continues, to deepen the findings and ensure data triangulation, the scope of the study will be expanded in later stages by examining the digital nudging project application forms of the 33 SMEs.

3 Preliminary Results

3.1 Digital Nudging Types: Guest Engagement Nudges and Infrastructure

Preliminary results of the study are examined under two themes to answer the research questions. The first theme covers the digital nudging applied. The second theme explains the conditions that shaped these selected digital nudging applications.

Table 5. Types of Digital Nudges

Category	Nudging Type	Applications
Guest Engagement Nudges	Informative&Educational Tools	Websites, QR codes, AR/VR applications, sustainability dashboards, digital mascots
	Choice Architecture	Pre-selection on menu, eco-friendly choices on menu
	Real-Time Feedback	Shower duration metrics, energy or water usage feedback
	Gamification & Reward Systems	Loyalty programs, game, rewards, quizzes, digital mascots
	Personalized Nudge	Automated marketing tools
Infrastructure	Operational, Back-Stage Control	Smart thermostats, motion sensors, remote heating control
	Capacity & Crowd Management	Visitor counters, redirection systems

Source: Authors' own

3.2 Contextual Determinants of Digital Nudging Adoption

This theme explores how SMEs are influenced by internal and external factors when implementing digital nudging strategies. External factors mainly represent the pressure they face to implement nudging, while internal factors point to the applications developed in response to the difficulties they encounter in implementation.

External factors such as water scarcity, conservation area regulations, eco-certifications, and social information gaps are forcing SMEs to develop digital solutions. For example, one SME manager points to the social information gap, stating that the application they will develop will address this issue, among many other factors:

> *"Guests lack information about the impact of nature on health and the importance of sustainable behavior. In this field, where the healing properties of nature have been scientifically proven, we want to use digital tools to raise guests' awareness." (I-14)*

Internal factors rely more on the organization's internal dynamics. Digital solutions, such as pre-ordering/menu selection, have forced breakthroughs in sustainability in order to solve operational problems such as food waste and staff workload. However, participants also emphasize that progress is faster when there is financial support for the applicability of digital nudging.

> *On the website, guests who wish to book a meal in our hotel restaurant not only make a table reservation for a specific date and time, but also choose the dishes they will eat. This helps to plan product purchases, sell existing products in stock, save restaurant human and material resources, and plan work" (I-9).*

4 Conclusion

This study addresses the digital innovation agenda in sustainability. By examining examples of how digital nudges have changed guest behavior in hospitality businesses, the research offers important implications for SMEs. Future studies could test the current study's findings using quantitative methods or other experimental methods. Studies could also broaden the scope of the results by including SMEs from different countries using different applications.

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Exploring the Impact of Translation Technologies on the Tourist Experience

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Abstract. Tourists may face communication barriers when travelling to a destination of a different language origin. Such barriers may affect tourists' overall travel experience and satisfaction. With smart tourism technology, such as translation applications that help tourists overcome language barriers, research on its use and impacts on tourists' experiences remains limited. Built on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), this study aims to explore tourists' technology acceptance of translation tools during their travels and how it affects their travel experience. Taking a quantitative approach, this study collects data from Japanese tourists traveling to overseas destinations using an online questionnaire. It aims to identify which attributes of translation technologies impact Japanese tourists' travel experience and behavioral intention. Theoretically, the proposed model extends current research beyond technology acceptance and use. The expected outcomes of this study demonstrate the importance of translation tools in enhancing tourists' experiences and provide service providers with insights into integrating real-time translation tools.

Keywords: Smart Tourism, Translation tools, Travel experience, UTAUT2, Generative AI

1 Introduction

The growth of international tourism necessitates effective communication across linguistic and cultural boundaries to enhance tourists' experiences and satisfaction (Lai et al., 2013; Kundan et al., 2025). Recent technological advancements have led to the emergence of translation applications such as Google Translate and later automated translation tools that integrated Generative AI. In particular, different from traditional translation tools, Generative AI can sustain multiple contexts, co-create content through culturally appropriate paraphrasing, and extend translation from decoding to collaborative meaning-making. Tourists are equipped with a spectrum of tools to overcome language barriers that they may face in any destination where they travel (Carvalho et al., 2023). Despite studies examining destinations facing rising tensions between tourists and locals, limited research has actually explored language barriers as a key constraint to more effective, inclusive communication among stakeholders (Li et al., 2023). From

the tourist perspective, recent studies have explored tourists' attitudes toward and adoption of Generative AI, such as ChatGPT, as essential tools for travel planning (Carvalho & Ivanov, 2024) and foreign language translations (Carvalho et al., 2023; Kundan et al., 2025; Lee & Lee, 2024). While evidence has demonstrated effectiveness, favorable attitudes, and adoption of translation tools amongst travelers (Carvalho et al., 2023; Kundan et al., 2025; Lee & Lee, 2024), a research gap on how the adoption of translation tools may affect the tourists' experiences and behavioral intention remains underexplored.

Given that Japan represents a substantial outbound travel market, Japanese tourists are a theoretically and managerially salient group for studying translation technologies. On the one hand, Japanese average English proficiency remains comparatively low, resulting that Japanese outbound tourists are more likely to encounter language difficulties. On the other hand, Japan scores very high on uncertainty avoidance cultural dimension (Hofstede, 2001), suggesting stronger motivation to use translation tools to reduce ambiguity and communication risk when travelling overseas. Therefore, this study hopes to bridge the research gap with the following research questions:

RQ1: What are Japanese tourists' current acceptance, experience, and intention to continue using language translation applications?

RQ2: How do the use and experience of language translation applications impact Japanese tourists' travel experiences, satisfaction, and revisit intention?

This study employs a quantitative approach to assess the current use and acceptance of language translation applications among tourists during their overseas travels, to elucidate the significance of such tools in their travel experience. To achieve the aforementioned research aims, this study proposes a research model based on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Venkatesh et al., 2012). This model has been commonly applied to assess user acceptance of innovative technology and translation tools (Kundan et al., 2025), providing a theoretically grounded basis for understanding the factors motivating the use of language translation applications. Furthermore, the robustness of UTAUT2 enables us to extend the current literature beyond technology acceptance and use experience, illuminating its effects on tourists' overall travel experiences and travel-related behavioral intentions. In addition to the constructs from UTAUT2 – such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, and habit – self-efficacy is added to offer a more nuanced understanding of user acceptance (Assaker et al., 2019). With the above background, this study proposes the following research framework (Figure 1).

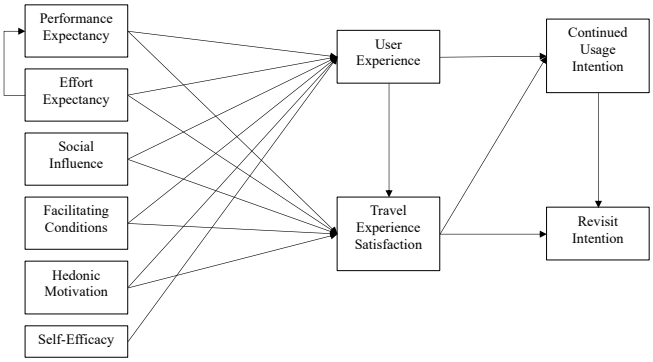

Fig. 16. Proposed Research Framework

2 Methodology

Taking a quantitative approach, the questionnaire instrument consisted of four sections. The measurement items were primarily derived from previous studies, with refinements based on the context of translation application use. Section 1 consists of screening questions about whether participants have traveled overseas in the past 12 months and used translation applications for their travel. Participants who answered "yes" may proceed to the following sections. Section 2 consists of general questions about the frequency of translation application use, its purpose, travel destinations, and foreign language capabilities. Section 3 concentrates on the scales of UTAUT2 and other dependent variables. UTAUT2 variables were derived from Assaker et al. (2019), Tseng et al. (2022), and Venkatesh et al. (2012). Items of self-efficacy were derived from Lu et al. (2019), while items for satisfaction with translation application use experience and continued usage intention were derived from Deng et al. (2010) and Wan et al. (2020). Finally, items for travel experience and revisit intention were derived from Huang and Hsu (2009), Neal et al. (2007), Um et al. (2006), and Yoon and Uysal (2005). All scale items are measured on seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). Section 4 includes demographic information about respondents, such as their gender, age, and education level.

Questionnaire items were initially designed in English. Back-translation was applied to ensure the accuracy of the Japanese translation. Two survey experts were invited to assess whether the translated measurement items were unambiguous. Their feedback helped refine the measurement.

The formal data collection was conducted through the travel panel of Rakuten Insight, one of the major professional online survey platforms. The first round of data collection took place in October 2025 and yielded a total of 534 samples. After removing ineligible data that failed the attention check question designed in the questionnaire, we acquired a total of 297 valid samples of Japanese travelers. When collecting the data, we established balanced quotas for gender and age distribution. Regarding data

analyses, we conducted PLS-SEM to examine the proposed model by using SmartPLS 4 software.

3 Results

Following the PLS-SEM procedure, we first assessed the reliability, convergent validity, and discriminant validity of the measurement model by confirming Cronbach's alpha (all > 0.7), composite reliability (all > 0.7), AVE values (all > 0.5), outer loadings (all > 0.7 except one item for Facilitating conditions at 0.636), and HTMT (all < 0.85). then collinearity issues were cleared by checking the VIF value of each construct (all < 5). Consequently, we examined the validity and significance of the SEM relationships through bootstrapping method. The pass coefficients (β) and significance (p values) were illustrated by Figure 2. Preliminary results show that effort expectancy, facilitating conditions, hedonic motivations, and self-efficacy significantly impact satisfaction with using translation applications (satisfaction TA) rather than satisfaction with travel experience (satisfaction TE), whereas performance expectancy significantly impacts satisfaction TE instead of satisfaction TA. Furthermore, satisfaction TA significantly increases satisfaction TE, demonstrating mediating effects. In addition, satisfaction TA and satisfaction TE indicate significant impact on behavioral intentions (continued usage intention and revisit intention).

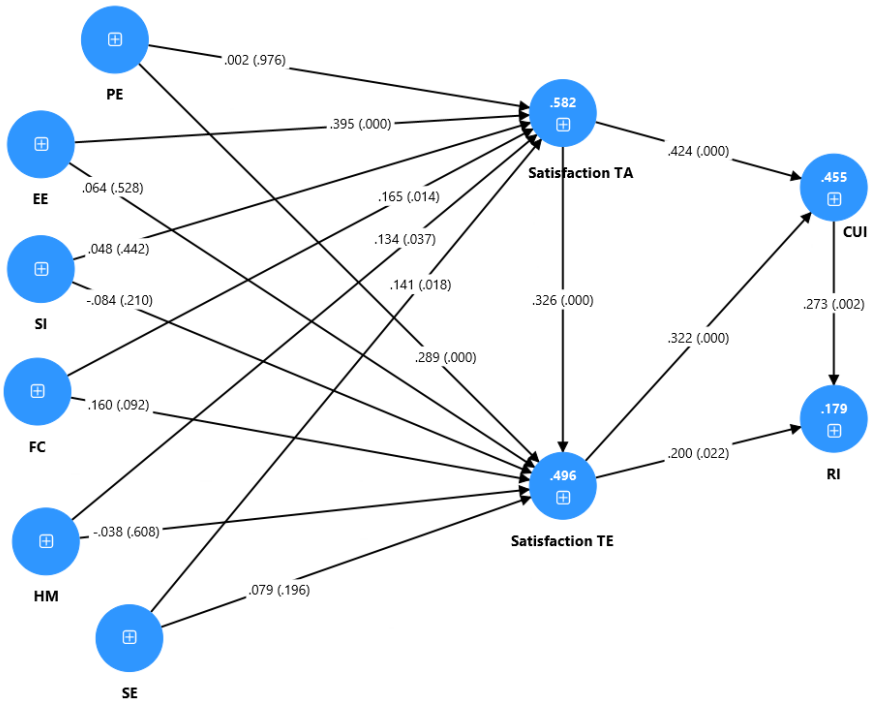

Fig. 2. Graphical Output of the SEM Relationships

4 Conclusion

Applying UTAUT2 to examine the acceptance of language-translation applications in tourism yields several theoretical and practical contributions. First, this study addresses gaps in the technology-acceptance literature by clarifying the determinants that shape users' adoption of translation applications. Second, the study integrates satisfaction with use, continuance intention, and revisit intention to explain how smart technologies influence travel experience and overall satisfaction. More specifically, this study highlighted that the performance expectancy of language translation applications had a significant direct effect on tourists' travel experience, which in turn predicted their revisit intention and continued use intention. Such findings extended the current theoretical discussion of the impact of a tool attribute on travel experience and made a practical contribution to developers to enhance the functions of these applications for pre-trip planning and effective translation during the trip. Moreover, this study indicated that satisfaction with the translation application use experience mediated travel experience and revisit intention. Overall, this study contributes to the research stream of how innovative tourism technologies facilitate host–guest interactions. It also provides developers with a clear understanding of which tool attributes most significantly improve user experience and drive continued use, thereby enhancing the design and refinement of translation applications.

Acknowledgments

This study was supported by **JSPS KAKENHI Grant** No. JP24K15533.

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Generative AI, Digital Content & Social Media Marketing

Adopting Generative AI for Online Reviews: The Role of Incentives Among Gen Z Travellers

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Abstract. Online reviews play a crucial role in the tourism industry, shaping travellers' booking decisions and influencing the reputation of platforms such as Booking.com or TripAdvisor. While previous research has explored motivations to write reviews, little attention has been given to a new and emerging behaviour: real travellers using generative AI tools to compose their reviews. This study examines how external incentives influence the willingness to adopt AI for this purpose. Through an experimental survey with Gen Z university students, we compared attitudes under incentivized and non-incentivized conditions. Results indicate that incentives enhance utilitarian motivations, such as time saving and effort reduction, while diminishing concerns about authenticity and fidelity of content. These findings align with the Theory of Planned Behaviour and Self-Determination Theory, suggesting that external rewards can shift intentions and moral evaluations. The study raises critical questions about authenticity and trust in digital tourism platforms.

Keywords: Online Reviews, Artificial Intelligence, Incentives.

1 Introduction

Online reviews have a significant impact on consumer decision-making, especially in the tourism industry (1). Consequently, understanding the motivations behind consumers' decisions to write reviews is crucial. Several studies have explored this phenomenon, identifying that motivations for engaging in electronic word-of-mouth (eWOM) behaviour can be intrinsic or extrinsic in nature (2). Specifically, intrinsic motivations include altruism, the desire to assist other consumers, and self-expression, driven by the pleasure of sharing personal experiences or the satisfaction derived from contributing to a digital community (3). While some studies suggest that review writing often arises from extreme satisfaction or dissatisfaction, such behaviour is generally regarded as organic eWOM, perceived as more authentic and trustworthy (4). However, when spontaneous review generation does not occur naturally, businesses often rely on solicited or incentivized reviews to enhance visibility. Although incentives may increase review volume and sometimes improving establishment ratings (5), they can also reduce content credibility and encourage manipulative practices (6), highlighting the ethical tension between commercial promotion and authentic consumer voice.

It is therefore critical to examine this phenomenon, as tourism review platforms such as Trip.com and Expedia openly acknowledge the use of incentives to encourage user participation. For instance, Trip.com promotes its "Write Reviews, Win Prizes" campaign, which rewards users with Trip Coins (a form of loyalty currency) for posting reviews that meet specific criteria, offering up to 600 coins per month (7). Similarly, Expedia states: "From time to time, we may offer our travellers incentives to complete reviews, such as savings or rewards points voucher for use on a future trip" (8).

Such practices raise questions about the boundaries between commercial promotion and the informational authenticity of reviews that travellers rely on for decision-making. In recent years, concerns about the credibility of online reviews have been further complicated by the rise of generative artificial intelligence (AI). Tools such as ChatGPT now enable the creation of persuasive and human-like texts, blurring the distinction between authentic and machine-generated content (9). This development poses a growing challenge for tourism platforms, as it amplifies long-standing debates about trust, transparency, and authenticity in user-generated reviews.

From a theoretical standpoint, this approach draws on the Planned Behaviour Theory (10) and Self-Determination Theory (11) to explain how external factors, such as incentives, can influence individuals' intentions and behaviours. Applying these theories to digital tourism contexts allows for a better understanding of how incentives and technological tools, such as AI, may shape users' willingness to engage in review writing. In this context, an emerging phenomenon, yet to be fully explored in the literature, has surfaced: the case of genuine travellers with authentic experiences who use AI to write or enhance their reviews. This behaviour creates an ambiguous scenario in which the narrated experience is truthful, but its articulation is mediated by technology. When combined with the presence of incentives, this practice significantly disrupts the balance between efficiency, authenticity, and trust in review platforms, opening a new field of study concerning the interplay between consumer behaviour and artificial intelligence in digital tourism.

Addressing this theoretical gap, the present study examines the extent to which users are willing to employ artificial intelligence (AI) tools to write tourism reviews, and how this willingness is shaped by the presence or absence of incentives. Specifically, it analyses how perceptions of fidelity, effort, and ethics vary depending on whether an economic reward is involved.

- RQ1. To what extent do economic incentives increase users' willingness to employ AI in writing tourism reviews?
- RQ2. What factors most significantly influence the decision to use AI, and how do these factors differ in contexts with and without incentives?
- RQ3. To what degree are users more permissive of inaccuracies or lack of fidelity in AI-generated reviews when an incentive is involved?

2 Methodology

To address the research questions, an intergroup experiment was designed using two versions of the same questionnaire: Version A (with incentive): participants were presented with a scenario in which writing reviews generated tangible benefits (specifically, redeemable points or discounts on Booking.com); Version B (without incentive): participants were presented with the same context but without any incentives. Both questionnaires included identical questions regarding the frequency of AI use, willingness to use AI for drafting reviews based on the scenario (with or without incentives), and the motivational factors influencing that decision. The questions used in this working paper are as follows:

a) If you were in scenario X (A or B), would you use AI to help you write reviews?
    i. Response options: Rated on a scale of 1 to 5, where 1 = "Disagree" and 5 = "Agree."
b) What factors do you think will influence your decision to use AI to write reviews in the future?
    i. Response options: Rate the importance of each factor on a scale of 1 to 5, where 1 = "Not at all important" and 5 = "Very important."
    ii. Factors: time savings, ease of writing long texts, obtaining benefits (discounts), improving writing quality, reducing writing effort, and ethics and honesty.
c) What level of demand would you have for the performance of the review-writing AI to use it frequently? Indicate the minimum level of accuracy required to use that AI instead of writing the entire review yourself.
    i. Response options: Rated on a scale of 1 to 5, where 1 = "Completely faithful to my experience" and 5 = "It can include invented content"

Additional sociodemographic questions (age, gender, academic year, university degree) will be used for the future extension of this working paper. The sample consisted of 159 university students (71 in Version A and 88 in Version B), aged between 18 and 31 years, with the majority of participants being between 20 and 23 years old, and enrolled in various programs within the fields of economics and business. This sample was selected to investigate the phenomenon of generative AI use in tourism reviews among Generation Z. Numerous studies highlight that this generational group, born approximately between 1997 and 2012, is characterized by high digital literacy, early exposure to technology, and a pragmatic attitude toward technological tools (12) and survey data confirmed this technological engagement: nearly 80 % of respondents reported using AI frequently or on a daily basis. The questionnaires were administered digitally, and data were collected during the second semester of the 2024–2025 academic year.

3 Preliminary Results

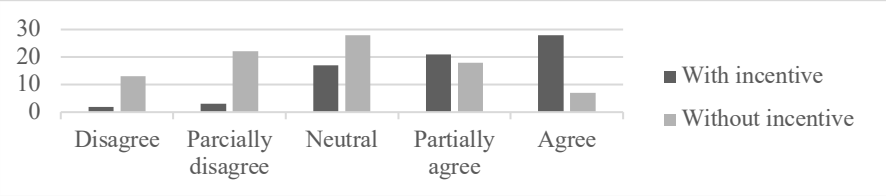
To provide an overview of participants' general disposition toward the use of artificial intelligence (AI) in writing hotel reviews, Table and Figure 1 presents the mean scores of willingness to use AI under the two experimental conditions.

Table 6. Overall willingness to use AI for writing reviews

Group	N	Mean willingness (1–5)	SD
With incentive (A)	71	3.99	1.03
Without incentive (B)	88	2.82	1.16

Source: Author's own

Figure 1. Overall scheme of willingness to use AI



Source: Author's own

Table 2 compares the mean ratings for motivational factors influencing the use of AI to generate reviews under incentive and non-incentive conditions. Results from independent samples t-tests show that all utilitarian motivations (such as time saving, writing ease, benefit obtaining (discounts), writing quality improvement, and effort avoidance) were rated significantly higher in the incentive condition (all $p < .05$). The largest effects were observed for effort avoidance ($d=1.33$) and benefit obtaining ($d=1.18$), suggesting that incentives strongly amplify self-oriented motivations to use AI. The factor ethics and honesty did not differ significantly between groups ($p=.17$), indicating that moral concerns remain stable regardless of incentives. Finally, respondents exposed to incentives required lower content fidelity from AI-generated reviews ($M=2.38$ vs. $M=1.83$, $p<.001$), showing greater tolerance for inaccuracy when benefits are present.

Table 7. Comparison of motivational factors to use AI

	A		B				
Items	Mean	SD	Mean	SD	t	p	Cohen's d
Time saving	4.31	0.89	3.97	0.94	–2.28	0.024	0.95
Ease of writing long texts	4.15	0.92	3.63	0.99	–3.31	<.001	1.00
Obtain benefits	3.41	1.10	2.56	1.04	–4.52	<.001	1.18
Improve writing quality	3.93	0.95	3.48	1.02	–2.82	0.005	1.00
Avoid writing effort	3.73	1.01	3.14	1.06	–2.81	0.006	1.33
Ethics and honesty	2.86	1.03	2.58	1.00	–1.37	0.17	1.27
Fidelity required	2.38	1.07	1.83	0.92	–3.47	<.001	1.07

Source: Author's own

3.1 Preliminary conclusions and future research

The preliminary results provide clear empirical insights into the proposed research questions. Regarding RQ1, findings show that participants were generally open to using AI tools for writing tourism reviews; however, their willingness increased significantly when an economic incentive was introduced. This suggests that the presence of tangible rewards reinforces behavioural intention, in line with the Planned Behaviour Theory (10), where perceived benefits and external motivators enhance intention to act. For RQ2, the comparison of motivational factors revealed that time-saving, ease of producing longer texts, and personal benefits were the strongest drivers under incentivized conditions. Conversely, ethical considerations and fidelity to personal experience were more salient in the absence of incentives. This pattern supports the Self-Determination Theory (11), as incentives appear to shift motivations from intrinsic (e.g., authenticity, self-expression) to extrinsic (e.g., efficiency, gain). Concerning RQ3, the results indicate that participants exposed to incentives were more tolerant of AI-generated content that was not fully faithful to their real experiences. While moral attitudes remained relatively constant, incentives seemed to lower the threshold of perceived acceptability toward minor inaccuracies in AI-assisted reviews. Future analyses will delve deeper into these findings by examining whether the willingness to use AI, and the associated motivational patterns, differ according to other participant characteristics gathered in the questionnaires such as their general disposition to travel for work or leisure, and their habitual tendency to write reviews. This will allow a more nuanced understanding of how user profiles interact with incentives in shaping attitudes toward AI-assisted content generation in tourism settings.

Acknowledgements

This work was supported by the Spanish Ministry of Science and Innovation MCIN/AEI/10.13039/501100011033/ FEDER, UE within the RevTour project (Ref: PID2022-138564OA-I00) and by the internal research contract (Ref: PREP2022-001087).

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Exploring social media strategies among Low-Cost Airlines

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Abstract. Concerning the low-cost airline sector, social media platforms have become essential digital tools that allow carriers to engage with customers, enhance brand visibility, and achieve differentiation in a competitive market. This study explores the social media strategies employed by three major European low-cost airlines (Ryanair, Vueling, and EasyJet) across Instagram and X. By analyzing 180 posts using a mixed-methods approach, the research identifies differences in content strategies characterized by tone, theme, and media format. Additionally, it explores how these factors influence audience engagement and content visibility on the platforms used. Early findings show diverse strategic orientations among the carriers, as well as the critical role of short-form video content in driving online reach. This exploration provides insights into how different digital communication strategies contribute to effective brand management in the aviation sector. The findings offer practical guidance for industry practitioners and researchers seeking to understand and optimize social media as a tool that improves communication and brand differentiation.

Keywords: Social Media Marketing, Low-Cost Airlines, Brand Visibility

1 Introduction

Following the deregulation of European Air Transport in the 1990s, the European low-cost airline sector has experienced unprecedented growth, with top carriers transporting over 555 million passengers in 2024, representing a 16.8% increase compared to 2019 (CAPA, 2025). This remarkable expansion appears within a highly competitive environment where traditional differentiation strategies based solely on pricing have become insufficient for sustainable competitive advantage (Chaffey & Ellis-Chadwick, 2019; Dwivedi et al., 2021). As digital technologies reshape tourism experiences, airlines increasingly rely on social media platforms to build brand identity, enhance customer engagement, and achieve competitive differentiation (Chou et al 2023).

Social media marketing has evolved from a supplementary promotional tool to a strategic necessity for airlines operating on thin profit margins (Emplifi, 2025). With nearly 5.17 billion people active on social media globally, representing over 60% of the world's population (DataReportal, 2025), these platforms offer cost-effective alternatives to traditional advertising while enabling real-time customer interaction. For low-

cost carriers, which must maximize marketing efficiency while maintaining operational cost control, social media provides unprecedented opportunities to achieve brand visibility without substantial advertising investments (Chou et al., 2023).

However, the comparative exploration of different social media strategies in driving audience engagement remains underexplored, particularly within the European LCC context. While existing literature addresses general social media marketing principles and individual airline case studies (Bilecen & Canarslan, 2023), comprehensive comparative analyses examining how multiple carriers leverage platform-specific strategies to achieve measurable visibility outcomes are limited. This research gap is particularly significant given the rapid evolution of tourism technologies and the increasing importance of digital channels in shaping traveler decision-making processes (Gretzel et al., 2015).

The primary purpose of this research is to explore and evaluate how three European low-cost carriers (Ryanair, Vueling, and EasyJet) employ social media platforms to boost audience engagement and content visibility. Specifically, this study aims to (1) explore the content strategies of these airlines by categorizing the tone and themes of their social media posts, (2) assess the visibility and engagement metrics associated with different types of content across Instagram and X, and (3) comparatively evaluate the effectiveness and distinctiveness of each airline's social media approach. This research is motivated by the critical role social media channels play in tourism and airline marketing, especially for low-cost carriers operating in highly competitive and price-sensitive environments (Picardo, 2016), where differentiation through digital innovation is vital for sustainable growth and customer reach.

2 Literature review

The tourism industry has undergone major digital transformation, with technology becoming a key driver of competitiveness and customer experience (Greenwood, 2025). Artificial intelligence, immersive media, and IoT are reshaping how tourism businesses engage with travelers (Phillips, 2024). Social media sits at the core of this ecosystem, offering immediate, interactive communication that bridges distance and time. Studies show that 75% of people use social media for travel inspiration, 60% of TikTok users gain interest in destinations through content, and 27% of travelers choose destinations based on Facebook posts (Remarkable, 2024). These trends highlight social media's strategic value for tourism businesses seeking brand differentiation in an increasingly competitive landscape.

Airlines have been early adopters of social media technologies, recognizing their potential for cost-effective marketing, customer service delivery, and brand building (Gascón et al., 2017). Studies indicate that social media marketing activities directly affect brand awareness, customer perception, and passenger willingness to recommend airlines. The effectiveness of these strategies varies significantly based on content approach, platform selection, and audience engagement tactics (Prados-Peña et al., 2022).

Recent research reveals that social media engagement particularly benefits low-cost carriers, as the effect of social media engagement on perceived value is comparatively

higher for LCCs compared to full-service carriers (Lee et al., 2018). This finding suggests that LCCs can leverage social media platforms more effectively to build customer relationships and enhance brand perception, potentially compensating for limitations in traditional service offerings.

Brand visibility in social media contexts involves both quantitative metrics (impressions, reach, engagement rates) and qualitative dimensions (brand recognition, recall, and association strength). Content strategy plays a crucial role in determining visibility outcomes, with research indicating that different content types, tones, and formats generate varying levels of audience response (Raza et al., 2025).

Previous research highlights different online communication strategies that successfully increase engagement and visibility across social media platforms (Ning et al., 2022). Humor emerges as an effective engagement driver, as demonstrated by Ryanair's provocative social media approach, which has generated significant attention and virality (Bilecen & Canarslan, 2023). However, the effectiveness of content strategies across different carriers remains understudied, especially regarding their impact on visibility metrics and competitive positioning.

3 Methodology

This research employs a mixed-methods comparative content analysis exploring social media content strategies of three leading European low-cost carriers: Ryanair, Vueling, and EasyJet. The study analyzes content published across Instagram and X, as these platforms are widely used by the three low-cost carriers.

3.1 Data collection

As the aim is to focus on content posted by the airlines mentioned, the dataset currently contains a preliminary sample of 180 social media posts (30 per airline per platform) manually collected from the official airline accounts (@Ryanair, @Vueling, and @EasyJet). Posts are being categorized across four tone dimensions: humorous/funny, professional/informational, promotional/persuasive, and cultural/inspirational. These tone categories were adapted from Laskowski's (2023) comprehensive "12 Tone of Voice Examples" guide, which identifies key tones such as friendly, formal, informal, professional, funny, informative, and persuasive that brands commonly adopt to connect effectively with their audiences. These four categories were selected because they represent some of the tone types most frequently used by airlines on social media and reflect the commercial, service-oriented nature of the industry, thus providing a clear structure for comparing communication strategies across platforms. Each post is also being coded for media type (image, video/reel, carousel, reply), engagement metrics (likes, comments, shares/retweets), and visibility indicators (impressions).

3.2 Data Analysis

Visibility measurement utilized an "impressions proxy" calculated as the sum of likes, comments, and shares/retweets, providing a transparent, consistently applicable metric

across platforms. Engagement rates were calculated relative to follower base size to allow meaningful cross-airline comparisons (Influencity, 2025). Content effectiveness was assessed through absolute performance metrics such as total interactions and engagement rate averages, analyzed along with qualitative coding of tone and media format to identify strategic patterns across carriers. By integrating both numeric and thematic dimensions, the methodology enabled cross-platform comparability and provided insight into how content type, tone, and platform affordances influence brand visibility in the airline sector.

4 Results

Initial analysis of the social media content from Ryanair, Vueling, and EasyJet indicates emerging differences in tone distribution, platform usage, content formats, and engagement patterns. Early observations indicate that humoristic/entertaining content tends to generate higher levels of visibility and interaction, while professional and promotional tones seem to perform less. Platform-specific dynamics are also becoming evident, with Instagram's visual and video-centric features appearing to drive greater impressions compared to the more text-focused exchanges on X. Additionally, consistency in posting frequency is emerging as a potential factor influencing audience engagement. These early insights highlight how social media may serve as an essential tool for airlines to differentiate themselves and connect effectively with their digital audiences.

5 Conclusions

This study demonstrates that social media marketing strategies are essential components of contemporary tourism technology ecosystems, empowering low-cost carriers to establish competitive differentiation through strategic content creation, platform-specific optimization, and audience engagement techniques. The research highlights notable variations in approach among Ryanair, Vueling, and EasyJet, illustrating how humor-based, entertaining content tends to generate significantly higher visibility and engagement compared to more traditional professional or promotional messaging. Additionally, the findings underscore the critical role of adapting content formats and tones to each social media platform's unique features and user dynamics, as well as the value of maintaining consistent posting schedules to sustain brand presence. These insights confirm that successful social media strategies contribute not only to enhanced brand awareness but also to building stronger customer relationships in an increasingly digitalized tourism landscape.

Future research of this study is currently being developed and will look forward to build upon the current dataset by incorporating a larger amount of social media posts, along with additional engagement metrics such as views, saves, and interactions to achieve an improved understanding of visibility and audience behavior. Additional investigation will likely include other platforms, particularly emerging ones such as TikTok, to explore how short-form video content shapes airline communication and traveler engagement. Comparative analysis among additional low-cost carriers is also being

considered to determine whether the emerging patterns observed so far represent broader trends within the LCC segment or are specific to individual airlines. In parallel, future stages of this research may contrast low-cost carrier strategies with those of full-service airlines to better understand how business models and brand positions influence tone, content strategy, and platform utilization within the evolving digital landscape.

Funding

The first author carries out the research with the support of a PhD grant from the University of Lleida (call 2025). This work was supported by the Spanish Ministry of Science and Innovation MCIN/AEI/10.13039/501100011033/ FEDER, UE within the RevTour project 'Use of online reviews for tourism intelligence and for the establishment of transparent and reliable evaluation standards' (Ref: PID2022-138564OA-I00) and by Institute for social and Territorial Development (INDEST) within the project "Artificial intelligence for social media and review analysis in the tourism sector" (call 2025CRINDESTABC).

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Trust in AI-Generated Content in Tourism: A Conceptual Framework

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Abstract. The rapid integration of generative artificial intelligence (AI) into tourism is transforming how travellers search for information, plan trips, and make decisions. However, despite the increasing use of AI-generated recommendations, reviews, and visual content, little is known about the psychological mechanisms underlying trust, perceived authenticity, and engagement. This conceptual paper presents a framework explaining how perceived AI-thenticity, the originality and realism of AI-generated information, influences traveller behaviour. Drawing on the Stimulus–Organism–Response framework contextualised with Source Credibility Theory and the concept of authenticity, the study proposes a multidimensional perspective that integrates cognitive, emotional, and ethical responses. It concludes by outlining a future research agenda to empirically validate this framework and to guide the design of responsible, human-centred AI applications in tourism.

Keywords: AI-thenticity, Trust, Emotional engagement, Ethical perception, Generative AI, Tourism technology

1 Introduction

Artificial intelligence (AI) is increasingly transforming the tourism and hospitality sectors, with growing adoption of generative tools such as ChatGPT and automated travel assistants [1]. These technologies offer significant benefits, including the ability to deliver personalised travel recommendations, provide real-time multilingual assistance, and support travellers during emergencies [2]. As AI becomes more embedded in the travel experience, new conceptual frameworks are emerging to interpret its impact on consumer perception and acceptance [e.g. 3].

A central concept in this emerging discourse is AI-thenticity, defined as both the originality of AI-generated content and its fidelity in reproducing or representing reality [4]. Perceived AI-thenticity has been shown to positively influence consumer trust and

patronage intentions [4]. Thus, trust becomes a pivotal factor in shaping tourist behaviour, particularly when travellers engage with AI-generated visuals and textual content. When users perceive such content as authentic and trustworthy, their perceived risk decreases, potentially enhancing engagement and influencing travel decision-making.

Despite its promise, AI-generated content presents unique challenges in conveying emotional depth. From a marketing perspective, Milovanović and Njeguš [5] argue that while AI can efficiently produce content, it lacks the nuanced emotional resonance of human creativity. This contrast highlights an important area of inquiry into how emotional responses differ when consumers interact with AI- versus human-generated travel materials. Existing studies have begun to explore the emotional and cognitive dimensions of AI-generated content. Zhu et al. [6], for example, investigate emotional arousal and decision-making in response to such content, yet current understanding remains limited. Similarly, Olszewski [7] underscores the scarcity of empirical research examining customer responses to AI-generated content specifically within tourism contexts. Seyfi et al. [2] identify additional gaps concerning the barriers and resistance travellers face when using AI tools in trip planning.

While the concept of AI-thenticity offers a promising lens through which to examine these dynamics, Bui et al. [4] highlight the need for further empirical exploration into how prospective tourists perceive authenticity and how these perceptions shape trust, emotional engagement, and behavioural intentions. Moreover, personality traits may moderate these relationships, yet this dimension remains underexplored [2]. This study addresses these gaps by proposing a conceptual framework that explains how perceived AI-thenticity shapes trust and behavioural intentions in the tourism context. The model introduces emotional engagement as a mediating mechanism and ethical perception as a moderating factor, offering new theoretical insights into travellers' responses to AI-generated content. In doing so, the study contributes to advancing the discussion on how technological innovation can enhance user trust, support responsible adoption, and create a more ethical and human-centred future for tourism.

2 Theoretical background and conceptual framework

This study employs the Stimulus–Organism–Response (S–O–R) framework [8] to explore how a stimulus, i.e. AI-generated content, shapes internal states such as authenticity perceptions, emotional engagement, and trust, leading to behavioural responses. The SOR model provides the established psychological architecture for analysing content influence, where external stimuli (S) are internally processed (O) to yield behavioural results (R). The following sections of the paper explain how this research manipulates and measures the dimension of SOR.

2.1 Stimulus (S)

The Stimulus (S) dimension of the SOR framework includes the external stimuli that subjects are experiencing. In the context of AI-generated travel stimuli, the S dimension would include various qualities of the content generated by AI. This study proposes to

consider several such elements, including Authorship label, Technical fidelity (quality), and Aesthetic valence (emotional appeal).

The Authorship label proposes to manipulate the image origin as generated by AI or a human, and assign explicit labels, such as "Generated by AI" or "Taken by a Human Photographer." Studies exploring how the content source (AI vs. human) affects trust, willingness to use, and decision-making at different stages of travel planning are still limited [9, 10]. The technical fidelity variable considers the photorealism and ability to distinguish a visual from a real photograph. Image fidelity may be manipulated by explicitly generating photo-realistic images vs. stylised (e.g., watercolour) images or destinations. And, finally, aesthetic valence would manipulate the targeted specific state, e.g., "excited crowd" vs. "tranquil beach."

2.2 Organism (O)

The Organism component represents internal processing of the stimuli within the participant (organism) and includes both cognitive/credibility appraisals and affective/emotional states.

Perceived AI-thenticity serves as a central organism's response in this study. AI-thenticity represents the primary cognitive appraisal of the image's genuineness and realness. This is the foundational perception that drives subsequent evaluations. The concept of perceived authenticity of AI content parallels Wang's [11] concept of symbolic authenticity, i.e., authenticity which is context-bound, socially structured, and a projection of an image tourism experience held by one. This context can provide a lens for understanding AI-thenticity in relation to the perceived originality, realism, and narrative coherence of AI-generated materials. It is anticipated that perceived authenticity not only enhances users' cognitive evaluation of content but also evokes emotional engagement, thereby influencing trust and decision-making in tourism settings.

To aid with the interpretive dimension of the proposed model in relation to how trust develops in digital contexts, the study draws on Source Credibility Theory [12], which posits that users' acceptance of information depends on their perceptions of the source's trustworthiness and expertise. In the context of AI-generated content, these dimensions of credibility become key drivers of trust formation and subsequent behavioural intentions.

Although AI-generated content can reduce uncertainty and enhance efficiency, its emotional and ethical implications are less well understood. Zhu et al. [6] call for deeper insights into the discrete emotional responses elicited by AI- versus human-generated content during the early stages of travel planning. Further, while much research to date has focused on the technical, security, and functional aspects of AI in tourism [13,14], the affective and perceptual dimensions remain underrepresented. Calderón-Fajardo et al. [15] and Zhu et al. [6] note that the authenticity and emotional resonance of AI-generated materials—key determinants of user trust and engagement—have not received adequate empirical attention.

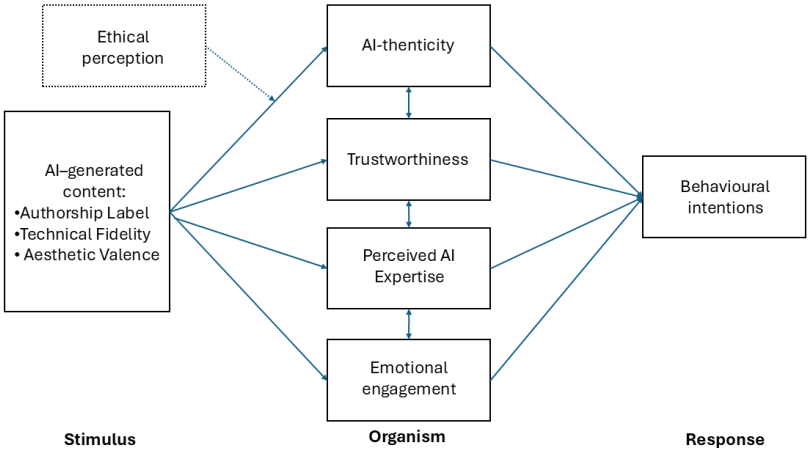
Integrating these perspectives, this study conceptualises traveller responses to AI-generated content as a process driven by both cognitive and affective mechanisms.

Therefore, the variables of perceived AI-thenticity, trustworthiness, expertise, and emotional engagement are added to the research model. Furthermore, Bui et al. [4] emphasise the ethical considerations surrounding AI-generated content, particularly regarding transparency, potential deception, and their subsequent effects on trust and perceived authenticity. This consideration suggests the inclusion of ethical considerations as a moderating factor between the stimulus and organism variables.

2.3 Response (R)

The Response (R) is the measurable behavioural outcome, which is the ultimate goal of the marketing Stimulus. Perceived AI-thenticity serves as a central organism's response, influencing emotional engagement — the affective reaction to content — which in turn fosters trustworthiness. Higher levels of trust subsequently reduce perceived risk and increase behavioural intentions, including engagement, adoption, and decision-making. In addition, when users perceive AI-generated content as ethically produced and transparently communicated, the positive impact of authenticity on trust is expected to be stronger. The hypothesised relationships included in this study are visualised in Figure 1 below.

Fig. 17. Conceptual Framework of Trust in AI-Generated Content



3 Proposed methodology

This study adopts a mixed-method design implemented in three sequential research phases to examine travellers' cognitive, emotional and perceptual responses to AI-generated travel content. The approach integrates experimental precision and validity,

with qualitative contextualisation, allowing for both behavioural and attitudinal insights.

The first phase seeks to identify visual attention mechanisms and early cognitive cues influencing perceived authenticity and trust within the S-O-R framework. It involves a controlled 2 (Authorship: AI vs Human) X 2 (Fidelity: Photo-realistic vs Stylised) X 2 (Valence: Excited vs Tranquil) laboratory experiment that compares the participants' neurophysiological reactions and perceptions of the presented travel materials, with a minimum of 30 participants. The quantitative data, triggered by Authorship label, Technical fidelity (quality), and Aesthetic valence, is collected using eye-tracking (number and duration of fixations) and facial expression tracking (level of engagement and confidence levels for each of the seven basic emotions). Qualitative data is further collected through eye-tracking (gaze pattern analysis), and semi-structured interviews. The results of the qualitative thematic and quantitative MANOVA analyses are triangulated and then compared between the cases of AI-generated versus user-generated travel materials.

In the second phase, an online vignette-based experiment will be conducted with the aim of simulating travel planning scenarios. Participants will evaluate AI-generated and human-generated content, providing quantitative data from the model (Fig 1) (structured questions with a 5-point Likert scale). Additionally, the online gaze analysis (heatmaps, number and duration of fixations) will be used to ensure the validity of the data. The cases will be compared using ANOVA tests (n=500), then, in case of differences with PLS-SEM. This design enables controlled manipulation of content type while capturing individual differences in perception and decision-making.

The third phase explores user interaction with an AI-powered travel assistant through text-based simulations. Participants' acceptance of recommendations, emotional reactions, and perceived authenticity will be analysed through qualitative thematic analysis of conversation transcripts. This phase deepens understanding of the affective and ethical dimensions of real-time AI interaction. Triangulating behavioural, perceptual, and emotional indicators will ensure methodological robustness and support theory building on AI-thenticity and trust.

4 Expected contributions and future research

This study will provide new theoretical and empirical insights into how travellers perceive, emotionally respond to, and trust AI-generated content in tourism. Unlike previous work which mostly analysed individual aspects of AI-generated content in isolation, this research proposes a consolidated S–O–R framework that brings together multiple stimulus attributes and their cognitive and affective effects. By integrating behavioural, perceptual, and emotional dimensions, it advances understanding of how AI-thenticity, emotional engagement, and ethical perceptions shape trust and behavioural intentions. The research extends the S–O–R framework and highlights key mechanisms driving user responses to AI-generated content. The findings will support the development of responsible design and communication strategies for tourism organisations and contribute to the ethical and transparent application of AI in marketing.

Acknowledgements

This research was funded by the European Union – NextGenerationEU, through the Recovery and Resilience Facility (Source 581), within the Institutional Research Projects programme at the University of Rijeka (project TRUST-AI-TOUR, uniri-iz-25-232).
The views expressed are those of the authors and do not necessarily reflect those of the European Union or the European Commission.

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Multi-modal detection module for Hospitality & Tourism manipulation review

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Abstract. Across foodservice and tourism, online electronic word-of-mouth (e-WOM) is a key information path that shapes pre-consumption quality judgments and choices, particularly for attractions and restaurants where experience and credence attributes dominate. However, the rapid advancement of generative artificial intelligence (GAI) has led to an increase in synthetic text and image reviews, creating confusion for consumers and eroding trust in review platforms. Deepfakes have recently become virtually indistinguishable from human-generated content, and synthetic faces can even be perceived as more trustworthy than real ones. Prior studies have proposed multimodal detectors in tourism settings, but these have been limited to narrow categories and have relied on GPT-4 and Imagen-3 generated data, leaving their generalizability insufficiently validated. This study proposes a text-first multimodal detection module tailored to restaurant and attraction domains, using Yelp and TripAdvisor data, to make the detector readily deployable in practice and thereby support more rational consumer decision making.

Keywords: Generative artificial intelligence, Multi-modal, Deepfake detection module.

1 Introduction

In contemporary consumer markets, online electronic word-of-mouth (e-WOM), that is, customer reviews and other forms of online reviews, has become a direct driver of consumer decision-making regarding product and service quality, and user-generated reviews are perceived as more trustworthy than traditional marketing information (Chen et al., 2025). More recently, advances in generative artificial intelligence (GAI) have enabled the creation of textual and visual review content that is increasingly difficult to distinguish from human-written reviews (Grewal et al., 2025; Zhang et al., 2025). However, the recent spread of GAI and other automated tools has been accompanied by a rise in manipulated online reviews, which hinders consumers' access to accurate information about products and services and threatens the integrity of platform reputation systems. As GAI has become more advanced, deepfake content such as synthetic faces has reached a level virtually indistinguishable from human-created media, in both images and text. Notably, synthetic faces are not only difficult to distinguish

from real ones but are sometimes evaluated as more trustworthy, and studies on deepfake political speeches show that human detection is vulnerable under certain modalities (Nightingale et al., 2022; Groh et al., 2024). In response to these risks, prior research has proposed a multimodal detector for GAI-manipulated tourism reviews that jointly analyzes text and images, explicitly defining GAI-based manipulation as a problem in the tourism domain and empirically demonstrating that such reviews can be effectively detected (Li et al., 2025). As GAI has developed, deepfakes and synthetic reviews have grown more sophisticated with each new model generation, creating a "cat-and-mouse" dynamic in which detection technologies must continuously evolve in response (Eisenstein, 2024). Moreover, although Yelp and TripAdvisor clearly state that they detect and remove fraudulent reviews, they do not provide detailed information about the technical foundations or modalities on which their detection systems rely. In particular, publicly available sources do not reveal whether they operate a dedicated multimodal detector that jointly analyzes text and images (Yelp Inc., 2025; Tripadvisor, 2025). Against this backdrop, the present study develops and evaluates a new module on real platform data from Yelp and TripAdvisor, extending the domain beyond attractions to include both restaurants and tourist sites, and proposes a domain-tailored fake review detector with enhanced potential for cross-platform generalization.

2 Literature review

2.1 GAI review

Generative AI (GAI) refers to a subfield of artificial intelligence that can autonomously generate novel content such as text, images, audio, and video that did not previously exist. By analyzing and learning from given data, GAI models internalize the underlying patterns and structures in that data and, on this basis, are able to produce entirely new outputs (van Dis et al., 2023). In tourism and restaurant contexts, online platform reviews directly affect firms' sales and performance, and user-generated information alone can be sufficient to build or undermine customer trust (Luca & Zervas, 2016). As GAI progresses, however, AI-generated and edited reviews and images can be seamlessly blended into experience-based feedback, making it increasingly difficult for consumers to distinguish authentic information from manipulated content.

2.2 GAI model development

Among text generation models, the GPT model has become a representative example of a general-purpose large language model (LLM) that supports natural language conversation, explanation, summarization, and creative writing, particularly since GPT-3 combined large-scale pretraining with instruction-following capabilities (Brown et al., 2020; Ouyang et al., 2022). The recently released GPT-5 has been introduced by OpenAI as "our most capable writing collaborator yet," and is described as being able to refine roughly sketched ideas into writing with literary depth and rhythm, while more reliably handling structurally constrained forms of text (OpenAI, 2025). On the image generation side, Google's Imagen feature has attracted attention for its high realism and

resolution in text-conditional image synthesis (Saharia et al., 2022). In particular, the latest version, Imagen 4, is presented in its official model card as "Imagen 4 is Google's most capable image generation model to date," emphasizing its ability to generate high-quality, high-resolution images across a wide range of visual styles (Google DeepMind, n.d.).

3 Methodology

3.1 Data collection

To evaluate the proposed GAI-based manipulation detection module across two domains, tourist attractions and restaurants, this study draws on review data from TripAdvisor and Yelp, two major online platforms that provide large-scale user feedback for these services. The corpus of "non-manipulated" reviews, assumed to be human-written, is constructed from reviews posted before 2019, in order to approximate patterns before the widespread diffusion of commercial GAI. Manipulated reviews are then generated by leveraging GPT-5, currently the most advanced publicly available GPT-series model, and Imagen 4, an image generation model that substantially improves upon previous versions in text rendering and visual fidelity (Fortin & Odoom, 2025; OpenAI, 2025).

3.2 Manipulation text review: detecting procedure

The text detection module in this study first consolidates and cleans Yelp and TripAdvisor reviews into JSONL format, then performs tokenization and embedding using RestaurantBERT and TourBERT. It subsequently extracts six procedures of textual features in parallel: (1) format regularity, (2) punctuation and stop-word usage, (3) syntactic structure, (4) logical coherence, (5) sentiment anomalies, and (6) template anomalies, yielding six axes of textual features extracted in parallel. The resulting feature vectors are then fed into a class-weighted XGBoost classifier to estimate the probability that each image is AI-generated, after which a decision threshold τ is applied to assign FAKE/REAL labels. (1) Format regularity examines whether paragraphing, line breaks, and the use of quotation marks or lists are written naturally and consistently, as in human-authored text. (2) Punctuation and stop-word patterns measure how similar the frequency and combinations of periods, commas, exclamation marks, and function words such as a, the, and are to typical human writing patterns. (3) Syntactic structure evaluates whether sentences are excessively simple or rigid, or conversely unnatural, based on part-of-speech sequences, sentence length, and syntactic configurations. (4) Logical coherence checks whether meanings flow naturally from one sentence to the next and whether abrupt topic shifts or excessive repetition occur. (5) Sentiment anomalies detect cases where the emotional tone of the review is misaligned with the given rating, or where overly neutral or extremely polarized expressions are repeatedly used. (6) Template anomalies identify whether the same sentence skeletons or phrasings recur across many reviews or businesses, and whether template-like expressions are abnormally concentrated in specific venues.

3.3 Manipulation text review: detecting procedure

The image module in this study first normalizes all attraction and restaurant review images collected from TripAdvisor and Yelp into 512×512 PNG files in the sRGB color space, and then divides each image into 128×128 patches. For each patch, it computes low-level texture and correlation features such as the variance of the Laplacian (capturing sharpness and texture strength) and Lag-1/Lag-2 inter-pixel correlation coefficients (capturing the regularity of brightness patterns between neighboring pixels), and aggregates these patch-level features into an image-level feature vector. The resulting image-level vectors are then fed into a class-weighted XGBoost classifier to estimate the probability that each image is AI-generated, after which a decision threshold τ is applied to assign FAKE/REAL labels.

4 Results

4.1 Expected results

Compared with the multimodal detector used in prior research, the proposed module is expected to achieve overall superior detection performance. In addition, by jointly analyzing content generated by GPT-4 and Imagen-3 versus GPT-5 and Imagen-4, this study aims to examine how much more natural and sophisticated next-generation synthetic reviews and images have become, and how such inter-generational quality improvements affect detection difficulty and performance gaps. Furthermore, by simultaneously covering two domains, TripAdvisor (attractions) and Yelp (restaurants), we expect to assess whether the proposed module can robustly detect manipulated reviews across different service contexts.

5 Conclusion

5.1 Theoretical and methodological implications

Theoretically, this study contributes by highlighting how GAI-generated manipulated reviews can undermine the originality and diversity of online reviews, and by proposing a detection framework that enables platforms to filter such content so that users are exposed to more trustworthy, high-quality information. Methodologically, the study proposes a next-generation benchmark for manipulated review detection in the GAI era by generating GPT-5– and Imagen-4–based synthetic reviews and images on real platform data, comparing their detection performance with a prior GPT-4/Imagen-3–based detector, and jointly assessing cross-domain and cross-platform transferability between TripAdvisor (attractions) and Yelp (restaurants).

5.2 Limitations and future study

The focus of this study is on detecting manipulated reviews generated by recent GAI models such as LLMs and diffusion models; accordingly, we adopt a practical cut-off by treating pre-2019 reviews as approximating a pre-GAI baseline. Nonetheless, the pre-2019 corpus cannot guarantee purely human-authored content, and residual non-GAI manipulation may still bias estimated detection performance, which constitutes an important limitation of this work. Since the proposed module currently remains at the design and data-construction stage, future research should conduct large-scale quantitative validation on TripAdvisor and Yelp, systematically compare performance against existing multimodal detectors, and perform ablation studies to assess the separate contributions of the text and image modules.

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Can a Virtual Influencer act as a region ambassador? Exploring their role in shaping destination image

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Abstract. Advances in Artificial Intelligence have accelerated the adoption of virtual influencers (VIs) across industries, including tourism. These computer-generated personas are emerging as innovative tools for destination communication, yet their effectiveness remains contested, especially in regional contexts where identity and belonging strongly shape audience responses. This study examines how users perceive and react to a regional VI created to promote a Spanish region, using Communication Theory to analyze the interaction between the sender (VI), message (content), and receiver (audience). Two online focus groups were conducted with local and non-local participants. Findings from the thematic analysis reveal that local audiences were more skeptical, perceiving the VIs as lacking authenticity and cultural depth, whereas non-local audiences expressed curiosity and greater engagement. The results indicate that user attitudes may mediate the effect of the VI's communication on engagement and destination image, while regional belonging can moderate this relationship. Overall, this research advances understanding of how regional VIs influence destination image formation and audience engagement. The study provides practical implications for destination managers and public institutions aiming to integrate VIs in regional branding strategies.

Keywords: Virtual influencers, Destination image, Tourism marketing.

1 Introduction

Social media platforms have reshaped how tourists discover and evaluate destinations, positioning influencers as key actors in this process [1]. Recent advances in Artificial Intelligence (AI) have introduced a new figure: the virtual influencer (VI). Unlike human influencers, VIs are digitally generated characters, offering advantages such as cost reduction, creative flexibility, and continuous activity [2,3]. In tourism, VIs are gaining attention as innovative communication tools [4,5,6]. For instance, the Italy's Ministry of Tourism created the VI "Venus" to attract international visitors, although the campaign was widely criticized for being inauthentic [7]. Similarly, the German National Tourist Board has recently launched "Emma", a VI designed to showcase the country online [8]. These cases illustrate both the growing interest and the controversies around using VIs in destination promotion.

Academic research has recently started to analyze the rise of VIs. Current findings indicate that their impact depends on factors such as source credibility, perceived authenticity, and emotional engagement [9,10,11]. Specifically, VIs tend to be effective when they are perceived as trustworthy and capable of eliciting emotional or parasocial connections with audiences, yet they often struggle when those perceptions are weak. Nevertheless, empirical evidence on how VIs affect the promotion of a destination remains limited, with mixed findings [6]. For example, some studies suggest that VIs can enhance visit intentions for cultural destinations under certain conditions [5], while others indicate that they may be less persuasive than human influencers when authenticity and cultural understanding are critical, as in cultural heritage tourism [6]. In addition, most of the former research has focused on international mainstream VIs (e.g., Lil Miquela and Shudu [4]; Luo Tianyi in China [12). However, the role of regional VIs in promoting a destination remains unexplored. These inconsistencies reveal a significant research gap.

To address it, our study focuses on regional VIs, designed not to represent a whole nation but to embody the identity of a specific region. We build on Communication Theory [12] to explain how meaning is exchanged between the sender, message, and receiver. In this study, the sender refers to the regional VI, the message to the characteristics of the content shared by the VI, and the receiver to the audience, whose regional sentiment shapes their perceptions and attitudes. The feedback component is reflected through engagement and the users' image of the region. Within this framework, we aim to explore how user attitudes mediate the effect of VI content on both engagement with the influencer and the destination image of the promoted region. We consider the moderating role of users' regional belonging sense, as local and non-local audiences may perceive the same regional VI in very different ways. Therefore, this study addresses the following research question: How do regional VI influence users' engagement and perceptions of destination image, and to what extent is this relationship shaped by the users' sense of belonging to the region?

2 Theoretical background

Social media has transformed how individuals consume information and create attitudes toward brands, products, and destinations. In this new communication ecosystem, influencers have emerged as key opinion leaders capable of shaping audiences' perceptions and behaviors through the content they share online [14]. Their ability to create authentic narratives and interact directly with followers fosters parasocial relationships that enhance trust and emotional connection [15]. Recent technological advances in AI have given rise to VIs, who are defined as computer-generated entities designed to resemble humans in both appearance and behavior [3; 10]. VIs can be entirely controlled by their creators, ensuring consistency, cost efficiency, and 24/7 availability, which makes them highly attractive for brands [2,3]. However, their impact on consumers remains unclear. While VIs can generate higher engagement and novelty appeal [10], they also face skepticism regarding their authenticity, trustworthiness, and emotional

capacity [9]. These insights suggest that understanding how audiences evaluate and relate to VIs is crucial for predicting their persuasive success.

In the tourism context, influencers are playing a relevant role in shaping destination image, engagement, and visit intentions [1]. Building upon this, tourism organizations have begun incorporating VIs to promote destinations and create innovative contents [10,11]. Nonetheless, academic evidence on their effectiveness remains inconsistent. [5] found that VIs outperform human influencers when endorsing cultural destinations, as their features enhance credibility and self-referencing processes. In contrast, [6] showed that in cultural heritage tourism, VIs are perceived as outsiders with limited understanding of human culture. Other studies identify source credibility, perceived authenticity, and emotional engagement as key antecedents of VI effectiveness [10,11], while the match between influencer type and destination characteristics also moderates persuasive outcomes [12]. Overall, while VIs offer unique advantages, there are still some challenges to generate engaging experiences. These inconsistencies highlight the need for further research examining how VIs can effectively promote destinations, particularly in regional contexts where identity and belonging may shape how audiences interpret and engage with these VIs.

3 Methodology: Qualitative Focus Groups

This study aimed to explore how individuals perceive and respond to a regional VI in the context of promoting a region. While previous studies have mostly examined international mainstream VIs (e,g., [4]), little is known about how regional digital personas, designed to represent the identity and culture of a specific territory, are interpreted by local and non-local audiences. To address this gap, two online focus groups were conducted via Microsoft Teams (to facilitate recording and transcription) in July 2025. Each session lasted approximately 90 minutes. The groups, separated between local and non-local respondents, discussed their impressions of Pilar Valero (@pilar.valero.allue), a VI created to symbolize and promote the region under study. The sample consisted of twelve participants (six per group). The first focus group (participants from the region) consisted of six individuals (66.7% female) with an average age of 21.8 years. The second group (participants from outside the region) also included six individuals (66.7% male) with an average age of 24.7 years. Participants were recruited using purposive sampling to ensure a contrast between regional and non-regional perspectives. All participants were university students or recent graduates, which provided a comparable educational background and familiarity with digital media.

Each session followed a semi-structured script that invited participants to discuss four themes: (1) content published by the regional VI, (2) general perceptions of the regional VI, (3) image of the region transmitted by the VI, and (4) sense of belonging of the VI. The focus group interview protocol was developed based on prior literature on VIs and destination marketing, as well as communication theory [12]. Data was analyzed through an inductive thematic analysis approach consistent with the principles of grounded theory [16,17]. Two researchers independently coded the transcripts to identify recurrent patterns and emerging categories. The codes were then grouped into

broader themes aligned with the study's objectives. Comparative analysis between the local and non-local groups was conducted to highlight differences in perceptions, attitudes, and emotional responses toward the VI.

3.1 Results

3.1.1. Perceptions of the content published by the regional VI

Participants generally appreciated the visual quality and realism of the images published by the VI. However, they highlighted that the posts were similar to those of a typical social media user, which diminished their perceived authenticity: *"She uploads things like a normal person; I wouldn't think she's AI-generated"* (P2, female, 22, local). Several participants expected a more creative use of AI, arguing that the VI could go beyond traditional influencer formats: *"Since she's created by AI, she could explore new topics or do things human influencers can't"* (P12, male, 24, non-local). Both groups agreed that a better balance between posts about places, lifestyle, and recommendations would help maintain followers' interest and avoid repetition: *"The balance of content is key. She should mix places, food, and lifestyle to keep people interested"* (P7, female, 25, non-local).

3.1.2. Perceptions of the regional VI

Participants described Pilar Valero as visually realistic but overly perfect, associating her image with an idealized digital model (*"She looks like a real person, but too perfect, like a magazine cover retouched with Photoshop"*; P1, female, 22, local). While non-local participants tended to show curiosity toward the innovativeness of the project and ("*I will follow Pilar, despite knowing the account has been created by AI, the project seems interesting"*; P11, male, 25, non-local), locals expressed skepticism, questioning the transparency behind the account: *"I wouldn't follow her; it feels like invented content. Maybe there's a company or government behind it"* (P4, female, 22, local; P5, male, 22, local). This contrast highlights how audience proximity and context shape perceptions of credibility and trust.

3.1.3. Image of the region transmitted by the VI

As for the regional image projected by the VI, it similarly elicited opposing interpretations. Local participants criticized the representation of the region as generic and repetitive, dominated by well-known tourist spots (*"Her profile shows the most typical things about the region; it doesn't offer anything new"*; P6, male, 21, local). They also emphasized that such content failed to convey the region's diversity or authenticity: *"To show what the region really is, she should include lesser-known places or break stereotypes"* (P2, female, 22, local). In contrast, non-local participants expressed curiosity and visual appreciation, indicating that the account could effectively generate interest among external audiences: *"I'm not sure if all the photos are real, but if they are, I'd like to visit those places"* (P10, male, 24, non-local); "*Some images make me wonder if this is real, and that makes me curious"* (P12, male, 24, non-local). While Pilar Valero may not delve into the locals' knowledge of the region, she can successfully stimulate discovery among outsiders.

3.1.4. Sense of belonging and identification of the VI

Local participants reported that the VI fails to reflect the cultural and emotional identity of the region, described as superficial: "*She represents the region in a very basic way; what makes us feel connected is not only landscapes but also our culture, our festivals, and our way of speaking"* (P4, female, 22, local). Several locals mentioned the absence of linguistic expressions typical of the region, which they considered a missed opportunity to enhance authenticity: *"There's a post that says 'a little walk in the park.' If she's from here, she could say "paseico", that would feel more ours"* (P3, female, 22, local). Non-local participants, on the other hand, imagined that they would feel greater identification if the influencer represented their own environment: *"If she posted about my city, I think I'd feel more belonging because I'd see it as mine"* (P7, female, 25, non-local). These findings indicate that cultural proximity and identity are key drivers of perceived authenticity and emotional connection in the evaluation of regional VIs.

4 Discussion, limitations and future research lines

The qualitative findings highlight the contradiction surrounding regional VIs for tourism promotion: while they attract attention and curiosity through visual appeal and technological novelty, they also evoke skepticism about authenticity and cultural depth. Locals questioned the influencer's credibility and felt underrepresented, whereas non-locals perceived her as innovative and engaging. This suggests that regional belonging and audience proximity may shape attitudes toward regional VIs, and that effective communication depends on aligning the sender (the VI), the message (content), and the receiver (audience).

Despite the insights provided, this first qualitative phase presents several limitations that should be acknowledged. First, the small sample size (n = 12) limits the generalizability of the findings, as the focus was placed on exploring perceptions in depth rather than achieving statistical representativeness. Second, the group setting of the focus groups may have encouraged certain participants to align their opinions with others (*groupthink effect*), potentially constraining the diversity of viewpoints expressed. Third, the analysis is context-specific, focusing on one region, which may limit the transferability of the results to other cultural or regional settings. Finally, the discussion was centered on a single VI, Pilar Valero, which may have introduced biases associated with her specific design, narrative style, or visual representation. These limitations will be addressed in the subsequent quantitative phase through a larger and more diverse sample.

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