

Use of immersive technologies in the promotion of tourist destinations: a bibliometric review

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ABSTRACT

In the context of the digital transformation of tourism, immersive technologies such as virtual, augmented, and mixed reality are redefining destination promotion by influencing tourist perceptions and decisions. However, the field exhibits conceptual fragmentation and research dispersion, which limits its structured understanding. The objective of this study is to identify research trends through a bibliometric analysis of scientific output. The methodology employed is founded upon a systematic review, adhering to the PRISMA 2020 guidelines, with particular emphasis placed on the principles of rigour and systematicity. The results indicate a transition towards a more clearly defined structure, characterised by thematic specialisation and an emphasis on experience and interaction. Additionally, there is an uneven distribution of knowledge and ongoing thematic evolution, which necessitates greater conceptual integration, contextual diversity, and critical approaches.

Keywords: Virtual reality; Augmented reality; Tourism; Immersive technologies; Destination marketing.

INTRODUCTION

In the context of the digital transformation of tourism, immersive technologies, such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), have become established as innovative tools that are redefining the promotion of tourist destinations (Virto, 2025; Varadzhakova et al., 2026). These technologies enable the simulation or enhancement of environments, thereby generating sensory and emotional interactions that influence the perception and selection of destinations prior to a physical visit. Their integration into experiential marketing strategies has been demonstrated to improve tourists' decision-making processes and strengthen the competitiveness of territories in digitalised environments (Apaza-Panca et al., 2025; Abusharieh et al., 2025). Furthermore, the utilisation of immersive technologies contributes to the sustainability of tourism by reducing the necessity for exploratory travel and facilitating access to destinations that are characterised by geographical, economic, or environmental limitations. In a global environment characterised by technological evolution and changes in consumer behaviour, these technologies constitute a strategic axis for innovation in tourism promotion (Abd Rahman et al., 2025).

Nevertheless, the accelerated growth of scientific production in this field demonstrates the need for a systematic approach that allows for the analysis of its evolution, the identification of predominant approaches, and the recognition of its main contributions. Despite the increased academic interest in the use of immersive technologies in the promotion of tourist destinations, the body of knowledge exhibits conceptual, methodological and thematic fragmentation that limits its comprehensive understanding (Fan et al., 2025; Roman et al., 2025). This dispersion hinders the identification of patterns in the evolution of the field, as well as the recognition of the main lines of research, influential authors, and predominant approaches. Consequently, the consistent interpretation of research dynamics and the consolidation of a coherent theoretical and empirical foundation are restricted (Yongqin et al., 2026). Conversely, the absence of a systematic integration of scientific production impedes the identification of emerging trends, expanding or diminishing areas, and the identification of knowledge gaps.

This situation imposes limitations on the construction of a structured vision of the field's development and the guidance of future evidence-based research (Şahin et al., 2026). Consequently, a substantial limitation has been identified in the organisation and articulation of existing knowledge. In this sense, the objective of this research is to identify research trends in the use of immersive technologies in the promotion of tourist destinations through a bibliometric analysis of scientific production. In order to achieve this objective, a series of questions have been developed to guide the analysis of the field of study: (i) What has been the evolution of annual scientific production on the use of immersive technologies in the promotion of tourist destinations?; (ii) What are the main theoretical, methodological, and applied contributions in this area?; (iii) How is scientific production geographically distributed, and which are the most influential countries, institutions, and authors?; (iv) What are the emerging, growing, and declining keywords that allow us to identify thematic trends in the field?

The application of these questions facilitates the coherent delineation and structuring of the bibliometric analysis. The originality of this study lies in the comprehensive structuring of the scientific body of knowledge related to the use of immersive technologies in the promotion of tourist destinations. This is achieved through a bibliometric approach that allows systematic identification of patterns, trends, and knowledge gaps. In contrast to preceding research, this study does not restrict itself to the organisation of extant academic production; rather, it updates the state of the art based on an analysis of thematic evolution, collaboration networks, and growth dynamics in the field. In this sense, the study provides a robust foundation for the development of a future research agenda, with the aim of strengthening the theoretical and applied development of the area and supporting decision-making in academic and tourism sector contexts.

METHODOLOGY

The research was conducted using a structured bibliometric review following the PRISMA 2020 methodology guidelines, which ensure transparency, rigour, and reproducibility in the identification, selection, and analysis of scientific literature (Page et al., 2021). This approach enables the systematic organisation of academic output and facilitates the identification of trends, patterns, and dynamics within the field of study based on explicit criteria and standardised procedures.

ELIGIBILITY CRITERIA

The eligibility criteria were defined with the objective of ensuring the quality, relevance, and coherence of the documents included in the analysis. The inclusion criteria encompassed

scientific articles published in indexed journals, written in English or Spanish, that directly addressed the application of immersive technologies—such as virtual reality, augmented reality, and mixed reality—in the context of tourism, travel, the tourist experience, or the tourism industry. The selection of documents was constrained to those that were available in Scopus and Web of Science, with the stipulation that they contained complete bibliographic information, thus enabling bibliometric analysis.

With regard to the exclusion criteria, three phases of the study were established. Firstly, duplicate records were eliminated and indexing errors rectified to refine the database. Secondly, documents lacking full-text access were excluded. However, no records were removed at this stage of the study because the analysis is based on metadata. Thirdly, irrelevant documents were excluded by reviewing titles, abstracts and keywords to verify their alignment with the research objective. This approach enabled the consolidation of a final sample that was both consistent and representative of the analysed field.

SOURCES OF INFORMATION

The information sources employed in this study were Scopus and Web of Science, two databases that are recognised for their comprehensive coverage, rigorous indexing methods, and high quality (Culbert et al., 2025). Scopus provides broad multidisciplinary coverage in conjunction with advanced analytical tools, while Web of Science is distinguished by its high selectivity and standardized citation structure, which facilitates access to reliable bibliographic information and analysis of trends, collaborative networks, and scientific output on a global scale.

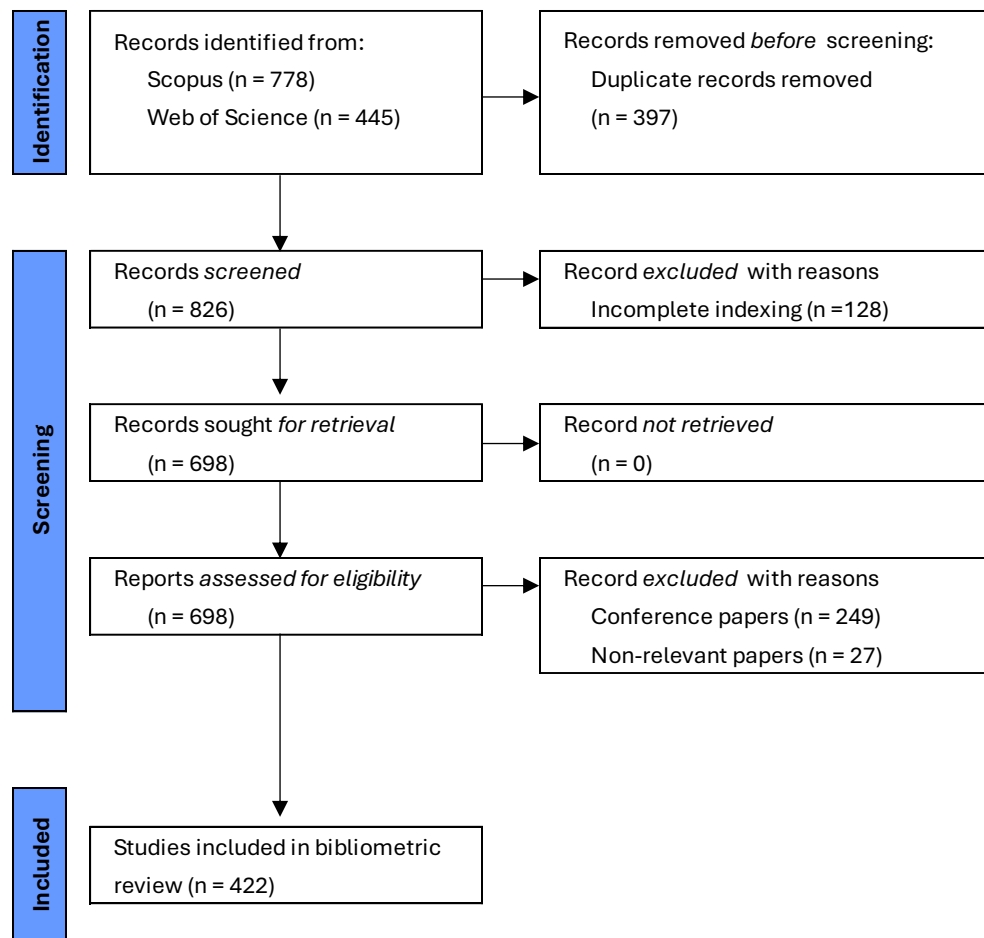
SEARCH STRATEGY

The search strategy was structured using specific equations for each database, derived from the inclusion criteria and integrating terms related to immersive technologies and tourism with Boolean operators (AND, OR) to optimize information retrieval; In Scopus, the equation TITLE (("virtual reality" OR "augmented reality" OR "mixed reality" OR "immersive technology*") AND ("tourism" OR "travel" OR "tourist experience" OR "tourism industry")) was used, while in Web of Science, TS=(("virtual reality" OR "augmented reality" OR "mixed reality" OR "immersive technology*") AND ("tourism" OR "travel" OR "tourist experience" OR "tourism industry")) was used, considering the equivalence of fields such as AK= for keywords and TS= for title, abstract, and keywords. This ensures the thematic relevance of the results and the acquisition of a representative initial set for bibliometric analysis.

SELECTION PROCESS

The document selection process was conducted in accordance with the PRISMA 2020 methodology, encompassing the identification, screening, eligibility, and inclusion of studies. Figure 1 presents a flowchart specifying the number of records in each phase. The application of inclusion and exclusion criteria in a systematic manner permitted the refinement of the initial database and the consolidation of a consistent final sample, thereby ensuring the transparency and traceability of the procedure.

Figure 1 –PRISMA flow diagram



Source: Prepared by the author based on Page et al. (2021)

DATA PROCESSING

The data processing was performed using Microsoft Excel to organise, refine, and analyse the bibliographic information. The database was meticulously structured, incorporating a range of variables including authors, year of publication, country, journal, keywords, and the number of citations received. This enabled the systematisation of information, the generation of bibliometric indicators, and the identification of patterns, trends, and relationships within the field of study.

RISK OF BIAS

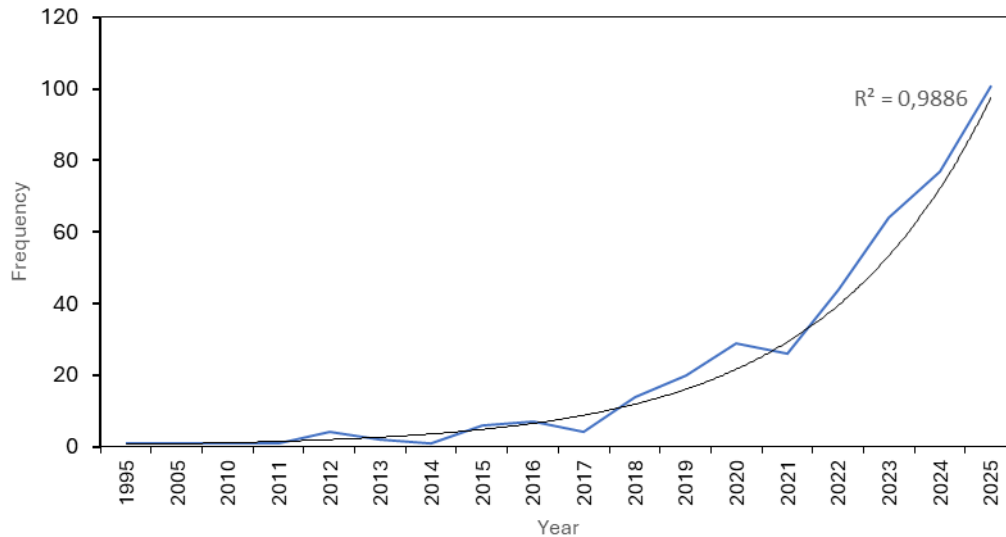
The risk of bias was mitigated by the implementation of clearly defined inclusion and exclusion criteria, and by the utilisation of databases with rigorous scientific indexing, acknowledging the potential biases associated with the selection of sources, the predominance of publications in English, the exclusion of non-indexed literature, and the employment of specific search terms, as well as biases stemming from the coverage of the databases and notification biases. Despite the limitations imposed by metadata, the study maintains methodological consistency through its systematic approach.

RESULTS

The scientific production on the use of immersive technologies in promoting tourist destinations developed between 1995 and 2026, exhibiting sustained growth and exponential development of 98.86%, as shown in Figure 2. This finding suggests an

acceleration in knowledge generation, particularly in recent years, where a progressive increase in the number of publications has been observed: The following sequence was observed: 4 in 2017, 14 in 2018, 20 in 2019, 29 in 2020, 26 in 2021, 44 in 2022, 64 in 2023, 77 in 2024, and 101 in 2025. The coefficient of determination is classified as high, confirming a consistent fit of the exponential model and a solid growth dynamic in the field.

Figure 2 – Evolution of the number of publications.



Source: Own elaboration.

The analysis of the extant scientific body of research identifies the 10 most cited articles, presented in Table 1. These articles represent the most influential contributions to the field, highlighting research on the application of virtual reality in tourism, consumer behaviour in immersive environments, and systematic reviews of technologies such as VR and AR. These contributions emanate from eminent authors such as Guttentag (2010), Kim et al. (2020), Tussyadiah et al. (2018), Yung et al. (2019), Huang et al. (2016), Loureiro et al. (2020), and Fan et al. (2022), and have been published in esteemed high-impact journals such as *Tourism Management*, *Journal of Travel Research*, and *Current Issues in Tourism*, thereby signifying the maturation and pre-eminence of the field.

Table 1 – Main contributions in the literature

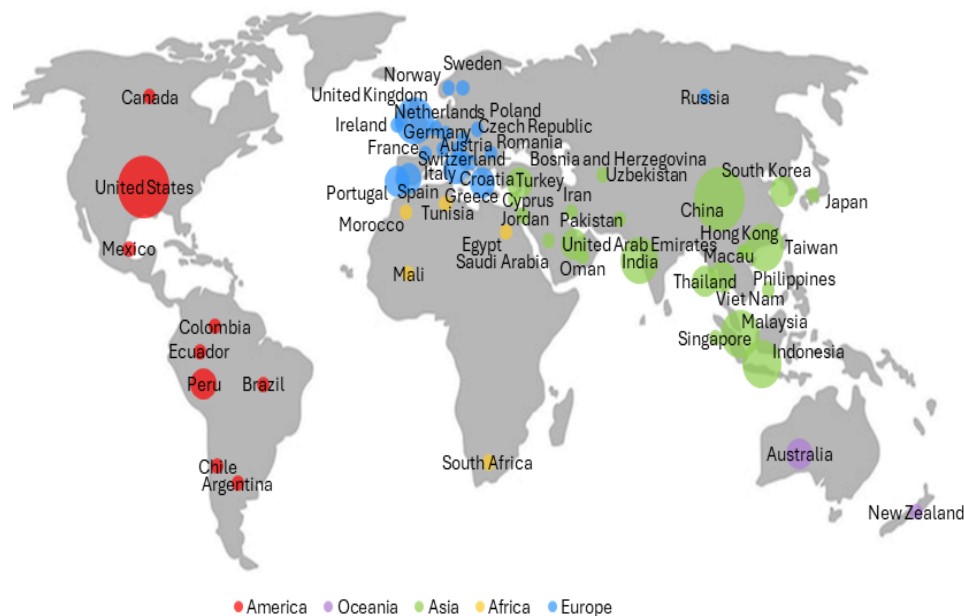
N	Authors	Article	Citations	Journal
1	Guttentag (2010)	Virtual reality: Applications and implications for tourism	1349	Tourism Management
2	Kim, et al., (2020)	Exploring Consumer Behavior in Virtual Reality Tourism Using an-Extended Stimulus-Organism-Response Model	1119	Journal of Travel Research
3	Tussyadiah, et al., (2018)	Virtual reality, presence, and attitude change: Empirical evidence from tourism	1028	Tourism Management
4	Kim, et al., (2020)	Exploring Consumer Behavior in Virtual Reality Tourism Using an-Extended Stimulus-Organism-Response Model	913	Journal Of Travel Research
5	Yung, et al., (2019)	New realities: a systematic literature review on virtual reality and augmented reality in tourism research	792	Current Issues in Tourism
6	Tussyadiah,, et al., (2018)	Virtual reality, presence, and attitude change: Empirical evidence from tourism	770	Tourism Management

7	Yung, et al., (2019)	New realities: a systematic literature review on virtual reality and augmented reality in tourism research	554	Current Issues In Tourism
8	Huang, et al., (2016)	Exploring the Implications of Virtual Reality Technology in Tourism Marketing: An Integrated Research Framework	535	International Journal of Tourism Research
9	Loureiro, et al., (2020)	20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach	532	Tourism Management
10	Fan, et al., (2022)	Immersive technology: A meta-analysis of augmented/virtual reality applications and their impact on tourism experience	491	Tourism Management

Source: Own elaboration

The global distribution of research, as presented in Figure 3, identifies the countries with the highest scientific output in immersive technologies applied to the promotion of tourist destinations. The United States (138) and China (133) are at the vanguard of knowledge generation, followed by the United Kingdom (90) and India (63), indicating a concentration in Asia and North America. Within Europe, Spain (39), Portugal (47), Germany (14), and Italy (18) are of note, while in Asia, significant contributions are observed from Indonesia, Malaysia, Taiwan, and Thailand. Latin America exhibits a moderate level of participation, with Peru (24), Colombia (10), and Ecuador (13) demonstrating a concentration of scientific output in developed countries and emerging economies with advanced technological capabilities.

Figure 3 – Global distribution

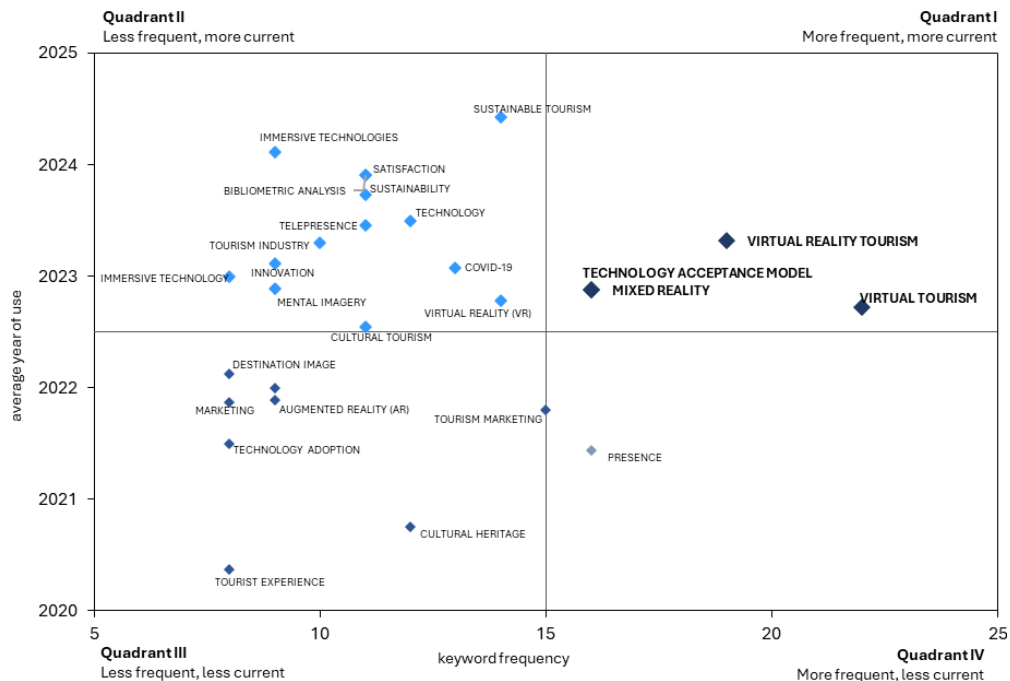


Source: Own elaboration

The keywords are then analysed according to their average year of use in a scatter plot, in which the Y-axis represents the average year of use and the X-axis the frequency of occurrence of the words. As illustrated in Figure 4, quadrant one corresponds to keywords that are growing in popularity, as they are the most frequently researched and recently used. It is evident that the groups identified in Quadrant two, which are characterised by their less frequent utilisation, have demonstrated a recent average year of emergence, thereby

signifying their contemporary relevance. Finally, quadrant four represents declining concepts, which, although extensively researched, have an older average year, suggesting a decrease in their use.

Figure 4 – Main keywords



Source: Own elaboration

Regarding keywords, the first quadrant is characterised by terms such as "Virtual Reality Tourism," "Mixed Reality," and "Virtual Tourism," which have been used with great frequency and since the years 2022 and 2023 in particular. The second quadrant encompasses nascent concepts such as "Sustainable Tourism," "Bibliometric Analysis," "Technology," and "Satisfaction," which, although less frequently cited, have been included in recent publications. The fourth quadrant encompasses terms such as "Tourism Marketing," "Technology Adoption," and "Tourist Experience," which have been the subject of extensive research. However, it should be noted that the average date of data collection for these terms is earlier, particularly for the years 2020 and 2021.

DISCUSSION

The discussion commences with a critical analysis of the bibliometric review results, followed by a comparison with previous studies to identify points of convergence and divergence in the field. In the following section, an examination of the prevailing research gaps is conducted for the purpose of identifying existing lacunae within the extant literature. Thereafter, a research agenda is proposed with a view to integrating future trends and needs. The study then goes on to present its theoretical, political and practical implications, alongside the methodological and analytical limitations that have been identified.

RESULTS ANALYSIS

The results demonstrate a progressive consolidation of the field of study, reflected in exponential growth in scientific output, indicating high academic and practical relevance of immersive technologies in tourism. However, this growth is not evenly distributed, but rather concentrated in a small group of countries, especially the United States, China, and the United Kingdom, reflecting a dependence on technological development and investment in

research. This concentration has the effect of limiting the epistemological diversity of the field and reducing the incorporation of perspectives from emerging contexts. The result is that knowledge building on a global scale is conditioned by these factors.

From an evolutionary perspective, the scientific literature demonstrates a transition from exploratory approaches to more structured theoretical frameworks in the study of immersive technologies in tourism. In its early stages, the literature addressed potential scenarios and technological limitations (Williams & Hobson, 1995), while recent studies incorporate explanatory models such as the Technology Acceptance Model and sociocultural approaches that analyse adoption, experience, and user behaviour (Abbas et al., 2025; Kokash, 2025). Conversely, an expansion towards interdisciplinary applications encompassing dimensions of well-being and health has been identified (Dupont et al., 2025), thereby confirming an evolution from a conceptual phase to a stage of greater theoretical maturity and applied diversification.

From a thematic perspective, a predominance of concepts such as virtual reality, augmented reality, and tourism is identified, which demonstrates a consolidation around specific technologies, as well as a possible conceptual saturation. The employment of terms such as 'technology acceptance model' and 'satisfaction' reflects a recurring focus on technology adoption and user experience. While these elements are relevant, they limit the exploration of more complex dimensions, including social, cultural, and ethical impacts. In this context, thematic analysis confirms that immersive technologies are positioned as central to tourism promotion, with applications in marketing, user experience, and sustainability, along with a shift toward experiential approaches focused on presence and well-being (Zuo et al., 2026; Zhou et al., 2026).

Moreover, the analysis of keywords indicates the presence of both established and emerging research strands. The emergence of novel terminology is indicative of the maturation of the field, whilst the advent of concepts such as bibliometric analysis and immersive technologies signifies a transition towards more integrative studies. Conversely, the emergence of declining terms such as tourism marketing or cultural heritage does not necessarily indicate a diminution in relevance. Instead, it signifies a transition towards approaches that place a greater emphasis on technology. This phenomenon is associated with recent studies that have reported advancements in the application of immersive technologies, along with technical and accessibility limitations, particularly in the development of mixed reality experiences (Hasanović et al., 2026).

The analysis of the most cited articles reveals the consolidation of a theoretical core focused on immersive experience and consumer behaviour in tourism. Pioneering research highlights the applied potential of virtual reality in various functions within the sector (Guttentag, 2010), while subsequent studies delve deeper into explanatory models of behaviour, incorporating cognitive, affective, and presence variables (Kim et al., 2020; Tussyadiah et al., 2018). In a similar vein, systematic reviews have been shown to identify relevant advances, whilst concomitantly highlighting persistent theoretical and methodological gaps (Yung & Khoo-Lattimore, 2019). This underscores the necessity to broaden the field to encompass emerging technologies and more integrated approaches, with a view to consolidating a more extensive and balanced research agenda.

COMPARISON WITH OTHER STUDIES

The study's findings are consistent with earlier research, which has demonstrated sustained growth and progressive consolidation of immersive technologies in tourism, particularly virtual and augmented reality, as drivers of digital transformation. In this regard, the present

findings align with studies that point to the expansion of these technologies across various sectors and their transition from exploratory approaches to integrated and systemic applications, as observed in the health metaverse, where similar processes of conceptual maturation are identified (Rikala et al., 2026). In a similar vein, the significance of sustainability, innovation, and digital transformation is in alignment with the findings of tourism entrepreneurship, wherein these dimensions are recognised as the fundamental pillars of the tourism industry (Ul Hassan et al., 2026).

Nevertheless, disparities are identified when compared to studies that address technological integration from more holistic perspectives. Whilst research in smart tourism emphasises the convergence of immersive technologies, data analytics and digital governance (Husen et al., 2026), the results demonstrate a paucity of integration between these technologies and a predominance of approaches focused on user experience and adoption. Furthermore, studies conducted within heritage contexts have identified inclusivity, authenticity, and sustainability as pivotal factors in the conceptualisation of immersive experiences (Asobayire et al., 2026). While these elements are acknowledged, they do not emerge as the central themes in this analysis.

Moreover, in contrast to the findings in associated domains, such as urban gamification, where there is a discernible integration of digital technologies and social engagement (Shandilya et al., 2026), the results indicate a thematic fragmentation that hinders interdisciplinary convergence.

RESEARCH GAPS

The second table provides a synopsis of the primary research lacunae within this domain, accompanied by a series of enquiries intended to provide a framework for subsequent investigations. This organisational structure facilitates the identification of existing gaps and guides their approach from comprehensive perspectives, thereby fostering the development of more consistent, articulated, and relevant knowledge for the scientific advancement of immersive technologies in tourism destination promotion.

Table 2 – Research gaps

Category	Research Gap	Future Research Question
Governance	Lack of specific regulation for immersive tourist environments	What regulatory frameworks guarantee the responsible use of immersive technologies in tourism?
Interoperability	Low integration between immersive platforms and existing tourism systems	How to improve interoperability between VR/AR platforms and digital tourism ecosystems?
Economic value	Limited measurement of the economic return on immersive experiences	How do immersive technologies impact the profitability of tourist destinations?
Extended experience	Limited evaluation of hybrid physical-digital experiences	How do hybrid experiences influence tourist satisfaction and loyalty?
Personalization	Lack of advanced customization models in immersive environments	How to optimize immersive experiences through data-driven personalization?
Digital inclusion	Gaps in access and use by vulnerable populations	What strategies reduce digital exclusion in immersive tourism experiences?
Digital security	Underexplored risks in privacy and data protection	How to mitigate security risks on immersive tourism platforms?

Longitudinal evaluation	Scarcity of studies on long-term effects	What sustained effects do immersive technologies have on tourist behavior?
Co-creation	Low user participation in experience design	How to integrate the user into the co-creation of immersive tourism experiences?
Technology transfer	Limited adoption by small tourism businesses	What factors facilitate the adoption of immersive technologies in tourism SMEs?

Source: Own elaboration

RESEARCH AGENDA

The proposed research agenda is informed by observed trends and aligns with the identified gaps. This agenda aims to redefine the field beyond its current emphasis on technological adoption. The focus of this study is to evaluate the real impact of these technologies on transforming tourism experiences. To do this, the study will analyse not only their acceptance but also their capacity for substitution, complementarity, or saturation. In addition, the study will examine their effective contribution in terms of economic and social value. Furthermore, the proposal entails additional exploration of the convergence between immersive technologies and intelligent systems, with a view to addressing the limited interoperability and low technological integration that has been observed. This suggests a shift towards data-driven ecosystems that integrate personalisation, prediction and real-time adaptation, thereby overcoming fragmented approaches and promoting scalable solutions, particularly in contexts characterised by limited technological development. It is further recommended that critical analyses of the immersive experience be incorporated, with consideration given to aspects such as authenticity, digital inclusion, accessibility, and information security, which have received scant attention to date.

Within this framework, it is pertinent to examine the role of these technologies in the reconfiguration of tourism and its potential shift towards mediated consumption, as well as their implications for different user profiles. Methodologically, it is proposed that research approaches be diversified using longitudinal, experimental, and participatory designs, to overcome the predominance of cross-sectional and quantitative studies. This will facilitate an understanding of dynamic processes, long-term effects, and co-creation mechanisms with users. Finally, the development of integrative conceptual frameworks is proposed, which transcend dependence on traditional models and allow for addressing dimensions such as digital governance, technology transfer, and inclusion. The present agenda seeks to strengthen the theoretical and applied articulation of the field, promoting more critical, contextualised research oriented towards solving real problems of contemporary tourism.

IMPLICATIONS

From a theoretical perspective, the study consolidates the field by organising existing knowledge and highlighting dominant patterns and structural limitations, thus challenging the centrality of technology adoption as an analytical axis. The necessity to develop integrative conceptual frameworks that articulate economic, social, and cultural dimensions is established, as are immersive technologies as factors that reconfigure the logic of tourism. At the political level, the findings indicate that the adoption of these technologies is contingent not solely on access, but rather on governance, regulation, and institutional capacity. The design of policies is required that promote digitisation with a territorial focus, reduce infrastructure gaps, and mitigate the risks of digital exclusion, under a strategy that integrates innovation, sustainability, and local development without exacerbating inequalities between destinations.

In practical terms, the integration of immersive technologies into the promotion of tourism necessitates a shift from instrumental approaches to ones that prioritise value creation. This suggests a necessity to redefine the user experience in terms of personalisation, authenticity, and meaningful interaction, thus moving beyond the mere digitisation of content. It is imperative that the sector's capacities are strengthened through continuous training and the implementation of collaborative innovation schemes among stakeholders.

LIMITATIONS

The study presents limitations associated with the use of specific databases, which implies a possible exclusion of non-indexed literature. The overreliance on metadata has the effect of restricting in-depth content analysis and limiting the interpretation of the findings. The selection of terms employed in the search strategy is instrumental in determining the conditions for information retrieval and the thematic coverage thereof. The preponderance of publications in English has the effect of reducing the inclusion of other linguistic contexts. The analytical process is characterised by methodological consistency.

CONCLUSIONS

The study demonstrates the field's transition from an exploratory phase to a more defined structure, which is still undergoing theoretical and applied consolidation. The development of knowledge is in response to the processes of thematic specialisation and the articulation of approaches that are centred on experience, interaction, and perceived value. The distribution of the phenomenon is found to be uneven on a global scale, and there is an ongoing thematic evolution. This configuration necessitates the enhancement of conceptual integration, the augmentation of the diversity of contexts, and the adoption of critical and systemic approaches that will guide the field's development.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data supporting the findings of this study are available upon reasonable request.

ETHICS STATEMENT

This study did not involve human participants or animals and therefore did not require ethical approval.

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