VIRTUAL TOURISM DYNAMICS: A BIBLIOMETRIC JOURNEY AND FUTURE ROADMAP

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Abstract

Purpose – The objective of this study is to review and assess the current literature on virtual tourism with the objective of identifying potential areas for future exploration as well as decipher the relationship between antecedents of virtual reality and customer engagement.
Methodology/Design/Approach – A systematic review methodology using bibliometric analysis was used to ensure the thoroughness of the topic under consideration. Two databases were used to gather the literature for the purpose of review.
Findings – The focus of virtual tourism research is shifting toward immersive technologies and a consumer-centric paradigm, with most of the literature emanating from China. Critical aspects such as user experience, satisfaction, engagement and the psychological impact of virtual environments including mental imagery, flow experience, destination image and authenticity, present promising avenues for further investigation.
Originality of the research – The study integrates flow theory and the Hedonic Information Systems model to offer a comprehensive understanding of how users' emotional and immersive experience evolve into engagement and behavioural outcomes within virtual tourism experiences.
Keywords virtual tourism, authenticity, mental imagery, customer engagement, visit intention, bibliometric analysis, systematic review

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INTRODUCTION

The tourism sector has been greatly impacted by technology, as it now offers customers exceptional and immersive experiences (Ramlavat, 2023). Technology has empowered customers, providing them more substantial autonomy and power to plan their holidays. An individual can easily make travel arrangements, access digital boarding passes, purchase museum tickets, and view restaurant menus through convenient digital platforms. Inevitably, face-to-face interactions and communication remain accessible to complement the digital experience (MySmartJourney, 2022). Among the emerging technologies, Virtual reality (VR) is a prominent and rapidly growing technological trend, and the business sector is instinctively recognising and embracing the potential offered by it. The tourism and hospitality industry finds virtual reality appealing due to its ability to digitally transport potential customers to tourist destinations (Barten, 2024).

According to forecasts, the Global Virtual Reality market in tourism is expected to experience substantial expansion from 2023 to 2030, with a CAGR (compound annual growth rate) of 33 per cent. The popularity of VR technology in tourism is increasing as a result of the growing number of virtual events (Dharmadhikari, 2023). VR tourism comprises a virtual recreation of a physical attraction, location, or tourist experience developed to persuade individuals to visit or enhance their past experiences. Virtual tourism utilises technology to offer viewers a fully immersive experience with a tourist attraction or an activity.

The Ministry of Tourism, Government of India has collaborated with OutsiteVR, a travel tech startup, to enable people to virtually travel India and boost Incredible India campaigns. This allows one to visit intriguing destinations throughout the country, for instance, "the ancient Key Monastery in Himachal Pradesh; the picturesque Kannur Light House in Kerala." The City Palace, Jaipur, Rajasthan, can also be virtually explored on the VR platform (Shroff, 2020). In 2021, Kerala Tourism embraced technology by launching an application for a virtual tour guide. The content showcases both well-known destinations for tourists and lesser-known attractions in the region (Outlook, 2022). There is also an enormous potential to amuse and educate people through interactive activities, games, and AI-based Collaborative Systems, which would boost market expansion (Global Market Estimates, 2022).

Businesses and governments may increase investment in research and development to create innovative technologies (such as virtual reality) and materials in tourism that enhance efficiency and reduce environmental impact (Čičin-Šain et al., 2023) improving the economic conditions and quality of life of the local residents and, respectively, sustainable tourism development.","DOI":"10.20867/tosee.07.4","event-title":"Tourism in Southern and Eastern Europe 2023: Engagement & Empowerment: A Path Toward Sustainable Tourism","language":"en","page":"59-70","source":"DOI.org (Crossref. This

underscores the need to expand the understanding of digital technologies beyond their role in tourism services and to explore how technological advancements shape the evolution of tourism experiences. Bretos et al. (2023) conducted a critical review of AR and VR in tourism but emphasised a need for more comprehensive framework and further research development. Similarly, Gutierriz et al. (2023) highlighted that scientific research should further investigate how digital integration enhances tourism engagement, providing new opportunities to examine the intersection of technology and tourism while enriching the existing literature.

The long-term endeavour of implementing and encouraging the adoption of technology in travel possesses significant strategic relevance (Perić & Vitezić, 2021). In addition, academic literature in this domain has largely focused on cognitive and functional drivers such as education, nostalgia, and technological embodiment (Bideci & Bideci, 2023; Flavián et al., 2021; Orús et al., 2021). Recent empirical work has begun to explore how system affordances and user characteristics, such as digital media literacy, can shape tourists' emotional responses and behavioural intentions within VR-based cultural heritage environments (Lee et al., 2024). Yet, there has been limited research on how individuals derive hedonic and experiential value from virtual tourism experiences, particularly in ways that enhance engagement and facilitate a state of flow. Understanding these mechanisms is crucial for designing immersive virtual tourism experiences that maximise user satisfaction and involvement (Tussyadiah et al., 2018). This study addresses these gaps through a systematic review and bibliometric analysis, aiming to develop a structured framework that advances the theoretical understanding of customer engagement in virtual tourism.

The study entails the research objectives as follows: RO1: To synthesise and analyse the existing literature on virtual tourism. RO2: To determine the literature gaps and discuss the key study areas for future research on virtual tourism. The rest of the paper is organised as follows: The next section discusses literature review, followed by methodology, bibliometric and systematic analysis. The discussion, implications, limitations and future research directions are also presented in the subsequent sections. The study findings contribute to the current body of knowledge in the specified area by presenting a more comprehensive view of how VR in tourism can enhance the experience of the users and lead to higher levels of immersion and engagement.

1. LITERATURE REVIEW

Virtual Reality (VR) has been increasingly recognised as a transformative tool in the tourism industry, influencing tourist behaviour, engagement, and destination promotion (Zhang et al., 2025). Companies have started integrating VR technology into effective marketing strategies to enhance the experience of customers by understanding how customers spend their time in leisure activities and their preferred devices for the same (Roy & Pagaldiviti, 2023). Virtual tourism enables consumers to experience both the physical and intangible elements of an attraction, providing an interactive exploration of the world from the comfort of their homes (Zhao & Huang, 2022). Virtual reality has a favourable effect on enhancing prior customer perceptions regarding a tourism site (Alyahya & McLean, 2022). Various tourist attractions have used digital technology to provide visitors with fully immersive experiences that go beyond time and location (Yang et al., 2022)in this study, we propose and test a model based on the SOR architecture, which includes tourists' experience of virtual tourism, technical readiness (TR. Virtual tourism may foster an affinity between visitors and destinations, playing a crucial role in helping tourists develop a deeper appreciation for the attractions of a place and encouraging them to participate in desirable behaviours, such as expressing a genuine intention to visit in person (Wang et al., 2022). Building on this understanding, recent research has increasingly underscored the role of virtual tourism as a powerful medium for destination marketing, capable of shaping tourists' perceptions and behavioural intentions.

The literature highlights the growing significance of virtual tourism. Sousa et al. (2024b) highlighted VR's potential as a promotional tool to enhance visit intention and identified key future research areas, including presence and devices, promotional strategies, and consumer segmentation. Lodhi et al. (2024) identified key themes such as the impact of VR on tourism, technology's role in enhancing satisfaction, and user acceptance of AR in travel. Their study highlights China's dominant contribution to the field and underscores the growing significance of immersive technologies in shaping hospitality experiences. Phoong et al. (2024) highlighted the rapid growth of virtual tourism research, particularly in the post-pandemic era, emphasizing its role in overcoming travel restrictions and promoting sustainability. Verma et al. (2022) reviewed virtual tourism's evolution, highlighting stakeholder dynamics, sustainability, and policy implications. While their study focuses on macro-level interactions, it overlooks psychological and experiential aspects. The bibliometric study by Ha et al. (2023) offers a valuable synthesis of the evolving research in virtual tourism. More recently, Kumar & Kushwaha (2025) conducted a large-scale systematic review using WOS and Scopus, covering 443 articles from 1995 to 2024. Their study offers a broad mapping of VR research in tourism marketing, highlighting dominant themes such as virtual worlds, telepresence, and mental imagery, along with frequently applied theories like S-O-R, protection motivation, and flow.

While comprehensive, their work primarily emphasises thematic and bibliometric trends. In contrast, the present study, drawing on a more focused dataset, goes beyond descriptive mapping to uncover VR-specific antecedents that trigger flow experiences, which subsequently lead to customer engagement and visit intention. By uncovering these psychological and experiential processes, this study offers actionable insights for designing effective promotional strategies and enhancing consumer engagement within virtual tourism environments. The growing focus on virtual reality (VR), augmented reality (AR), and the metaverse highlights their transformative potential in tourism. This increasing research trajectory underscores the necessity for further investigation into VR's impact on customer engagement and destination perception.

A growing body of research underscores the need to consider both hedonic and utilitarian dimensions when examining user interaction with immersive technologies, particularly in leisure-oriented contexts like virtual tourism. One such study explored user responses to a virtual surfing experience, demonstrating that both the enjoyment of being in a state of flow and traditional technology acceptance factors like usefulness and ease of use shaped users' intentions to adopt VR (Huang et al., 2023). This reflects that the hedonic elements, such as immersive enjoyment, enhance the predictive strength of the traditional acceptance models. In a related digital context, Jo (2022) found that continued use of social networking services was more strongly influenced by enjoyment and communication than by perceived usefulness, suggesting that users of experience-driven systems are motivated more by emotional engagement as compared to instrumental benefits. Lee & Youn (2025) showed that both cognitive and emotional pathways shaped the aesthetic impact of VR, especially for users with a strong orientation toward hedonic experiences. In the metaverse retail environment, Zhong & Hamouda (2024) integrated flow theory within a broader behavioural framework to explain user participation in metaverse shopping platforms, with perceived enjoyment and immersion emerging as key predictors. Meanwhile, Uhm et al. (2023) demonstrated that gamified suspense in VR sports enhanced user flow, enjoyment, and intention to participate. This emphasises how emotional engagement can be strategically used to shape user behaviour. Together, these studies offer a compelling foundation that flow theory and the HIS model provide meaningful insights into how people engage with immersive systems. Applying both frameworks to virtual tourism allows for a deeper understanding of how affective engagement and system interactivity together shape user attitudes and behavioural intentions.

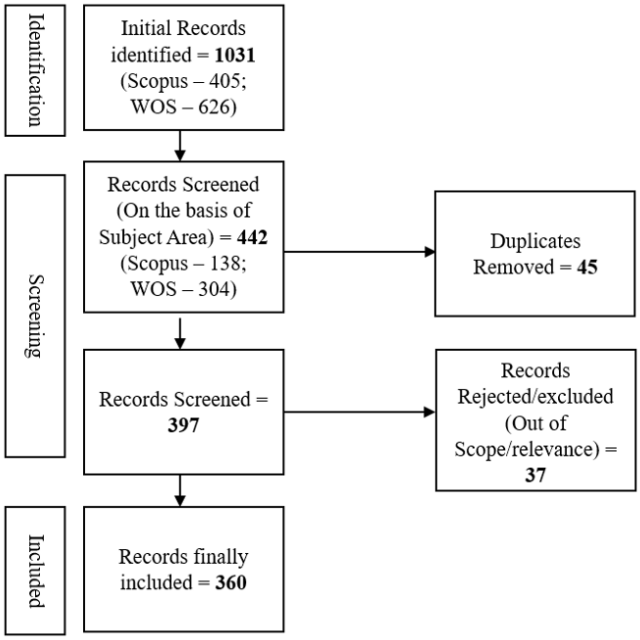
Building on these insights, the present study extends the existing literature by applying flow theory and the Hedonic Information Systems (HIS) model to the domain of virtual tourism, a setting that is both affectively rich and technologically mediated. While previous research has explored these theories in areas such as VR sports, metaverse retail, and digital art engagement, few have examined how they jointly explain user engagement and behavioural intentions in virtual tours. This study proposes an integrative framework that considers both the emotional gratification users derive from immersive experiences and the interactive qualities of the virtual system itself. Hence, the study contributes to a more nuanced understanding of how virtual tourism platforms can foster meaningful connections and drive future travel behaviour. This theoretical integration not only fills a gap in the current tourism literature but also offers practical implications for designing more emotionally engaging and user-centred virtual tourism experiences.

2. METHODOLOGY

A systematic review methodology using bibliometric analysis was used to comprehensively explore the literature on the topic under consideration which serves as the foundation for the development of a theoretical framework and model. The literature for the present study was collected from two databases, namely Scopus and Web of Science. The keywords used for the initial search on both the databases were: "Virtual Tourism" OR "Virtual Reality Tourism" using the search criteria TITLE-ABS-KEY in Scopus and TOPIC in Web of Science (WOS). The review spans from 1999 to 2024 as 1999 marks the inception of documented academic discourse on virtual tourism within indexed databases. This timeframe provides a dynamic perspective on shifts in technology, consumer behaviour, and research priorities, offering a comprehensive understanding of the field's progression. The initial search yielded 405 results on Scopus and 626 results in WOS, comprising a total number of 1031. The filters were applied to reach a specific category and number of articles, which were required for the purpose of this study. The first filter applied was Subject Area or WOS categories. The subject areas were limited to "Business Management and Accounting, Social Sciences, Arts & Humanities and Psychology." The WOS categories included "Hospitality Leisure Sport Tourism, Management, Business, Humanities Multidisciplinary and Psychology Multidisciplinary." The second and third filter applied was "Language" and "Document type." The journal articles, which were in English language, were included for further investigation. Journal articles are included due to their rigorous peer review, comprehensive methodology, and high credibility, ensuring reliable and original research (Coombes, 2024). After the application of filters, the total number of articles was reduced to 442, which included 138 articles from Scopus and 304 from WOS. Further, 45 duplicate articles that were there in both databases were removed, after which 397 articles were left for further screening. A rigorous screening process that aligned with the study's pre-defined objectives was undertaken. Articles were manually screened on the basis of abstract, context, and thematic relevance to ensure their substantive contribution to the understanding of virtual tourism from a psychological and experiential perspective. Articles were excluded if they lacked alignment with the core constructs of virtual tourism and immersive technology adoption or demonstrated methodological limitations.

Therefore, 360 articles were considered for the review (Boell & Cecez-Kecmanovic, 2015)SLRs are claimed to be a 'standardized method' for literature reviews that is replicable, transparent, objective, unbiased and rigorous, and thus superior to other approaches for conducting literature reviews. These are significant and consequential claims that – despite increasing adoption of SLRs – remained largely unnoticed in the information systems (IS. By examining publication patterns and thematic shifts, the review contextualises contemporary research within its historical trajectory, enhancing the study's relevance. In addition, to ensure both rigour and scholarly relevance, the selection of key studies was guided by their ABDC ranking and Scopus quartile positioning. The final dataset includes six studies published in ABDC- A category journals, four in Q1, three in A* journals, and three in Q3 journals. This distribution reflects a balanced integration of top-tier and high-impact research, complemented by strong contributions and contextual insights from relevant sources. The systematic review of the key studies was conducted to observe the key contemporary patterns in the literature. The review was carried out using the BiblioShiny software (Aria & Cuccurullo, 2017) to simplify, analyse, map, and visualise the data.

Figure 1: **Inclusion-Exclusion Flowchart**



Source: Authors' Construction

3. RESULTS OF THE BIBLIOMETRIC AND SYSTEMATIC ANALYSIS

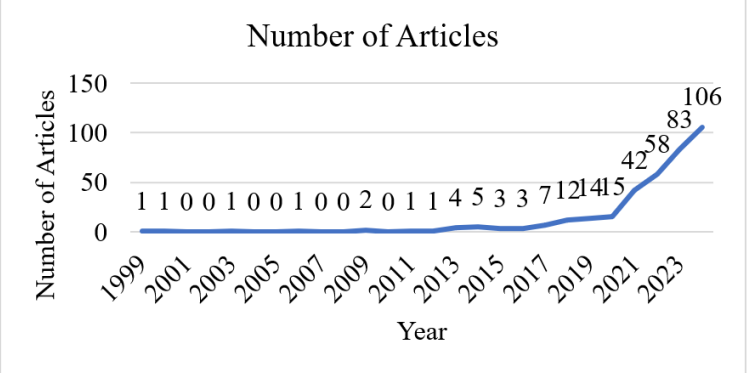
3.1 Main Information and Overview

A total of 360 documents were gathered from 106 different sources. Typically, each document has received an average of 41.46 citations. 702 keywords plus and 1237 author keywords were observed in total. Keywords plus are those words which are given by the databases according to the dictionary and the article, and author keywords consist of words chosen by the author(s) to accurately represent their work. Beyond this information, most of the papers had multiple authors, with average number of 3-4 co-authors for each study and only 33 documents were single-authored. Based on the data obtained from Biblioshiny, it has been observed that there is an annual growth rate of 20.51% in the domain of virtual tourism research, which highlights the significance of further studies required in the realm of virtual tourism as it provides a good opportunity to understand this field more comprehensively.

3.2 Annual Scientific Production

Figure 2 presents the annual scientific production in terms of year-on-year growth in the number of studies. The number of articles on virtual tourism witnessed growth majorly from 2017. The majority of articles have been published in the year 2024, with 106 articles, followed by 83 articles in 2023 and 58 articles in 2022. The substantial rise in publications suggests that virtual tourism has gained significant traction as a research domain, likely influenced by technological advancements and the need for alternative tourism experiences during and after the COVID-19 pandemic. Furthermore, virtual tourism is emerging as a critical area of inquiry, reflecting growing academic and practical relevance in addressing evolving consumer preferences and industry challenges.

Figure 2: **Annual Scientific Production**

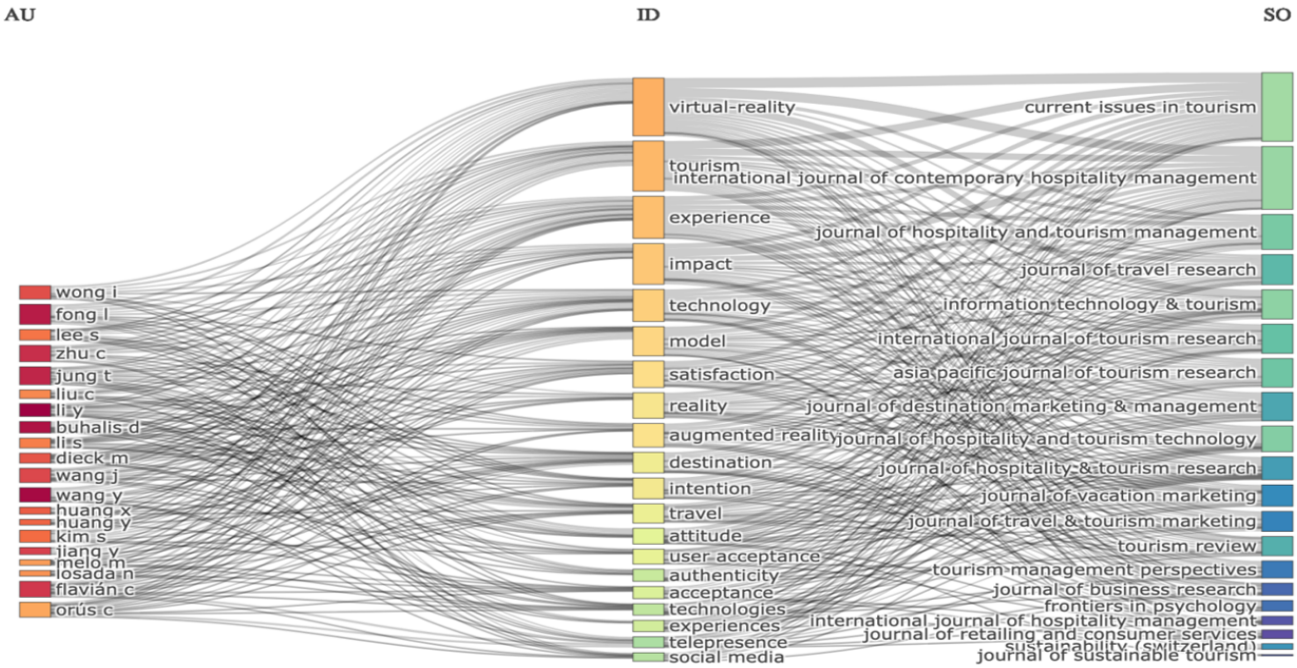


Source: BiblioShiny

3.3 Three-Field Plot

Figure 3 presents a three-field plot which visually represents the connections between the authors, keywords, and sources. The authors opted for a trio of the most vital metadata fields for generating this plot. The authors are presented on the left side, keywords are positioned in the middle, while sources are presented on the right. The visual representation is generated that showcases the association among the leading authors, sources, and significant terms. A total of 20 elements were chosen for each field. The size of each item's bar reflects its contribution to the subject under review. The top words included virtual reality, tourism, experience, technology, satisfaction, destination, intention, user acceptance, authenticity, technologies, telepresence and others.

Figure 3: **Three-Field Plot**

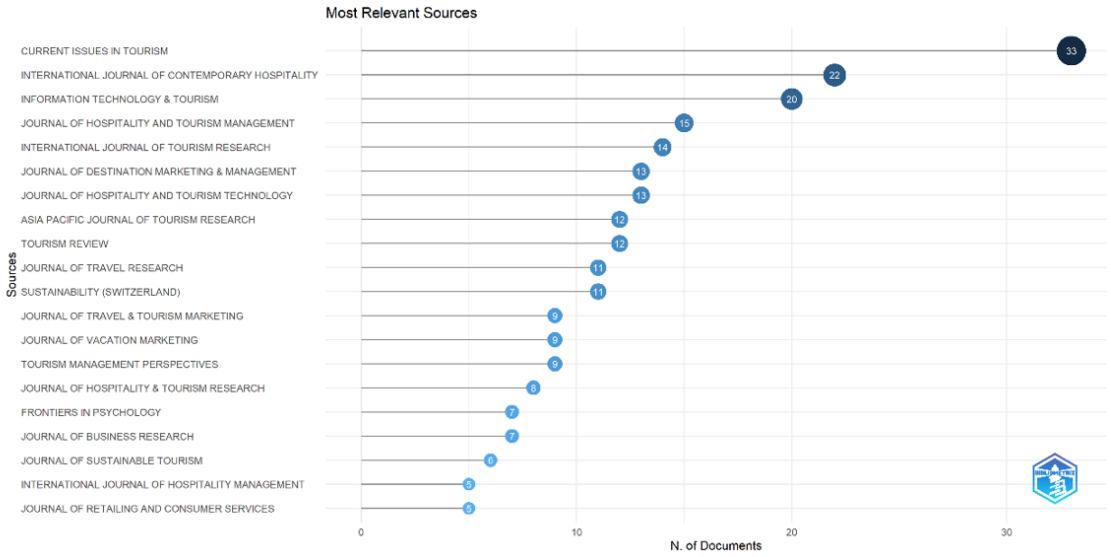


Source: BiblioShiny

3.4 Most Relevant Sources

Figure 4 depicts the most relevant journals/sources for research on virtual tourism. A significant number of articles were found in the top 20 sources. The literature includes a significant number of documents from the Current Issues in Tourism, followed by International Journal of Contemporary Hospitality and Information Technology & Tourism.

Figure 4: **Most Relevant Sources**

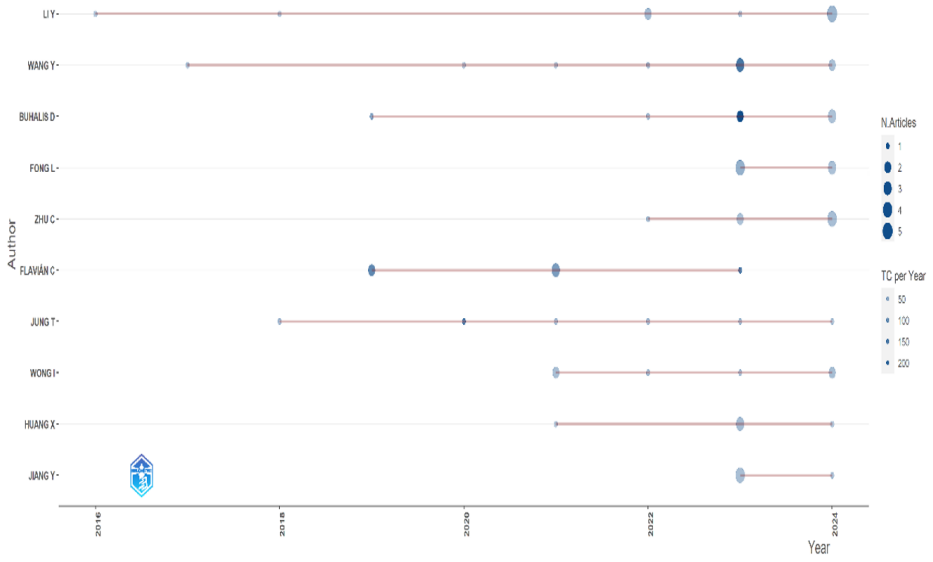


Source: BiblioShiny

3.5 Authors' Production Over Time

Figure 5 showcases the 10 most notable authors in the domain of virtual tourism studies. The size of the bubbles corresponds to the number of documents, whereas the straight line shows the author's timeline. The colours' intensity increases with the total number of citations received by the articles each year. Embarking in 2021, there has been a notable surge in activity, with 2024 standing out as the most productive year. From 2016 to 2024, several authors stood out for their productivity. Li led the group with 10 articles, followed by Wang (9 articles), Buhalis, Fong and Zhu, each with 7 articles to their name. Other authors also made notable contributions during this period. Conclusions drawn from this information can help identify current researchers and authors in the field. In addition, future researchers can use the articles that are relevant to their studies as reference materials.

Figure 5: **Author's Production Over Time**



Source: BiblioShiny

3.6 Countries' Scientific Production

There are significant contributions of research articles from different countries in the field of virtual tourism research (Table 1). China (265), the United States of America (75), the United Kingdom (63), Spain (44), and India (41), are the top 5 countries that made substantial contributions in this particular area of study. However, when the authors compare the number of articles contributed by China with other nations, there is a significant disparity that calls for further research in different parts of the world within the scope of this study.

Table 1: **Countries' Scientific Production**

Region	Frequency
China	265
USA	75
UK	63
Spain	44
India	41
South Korea	35
Australia	33
Italy	32
Portugal	28
Malaysia	23

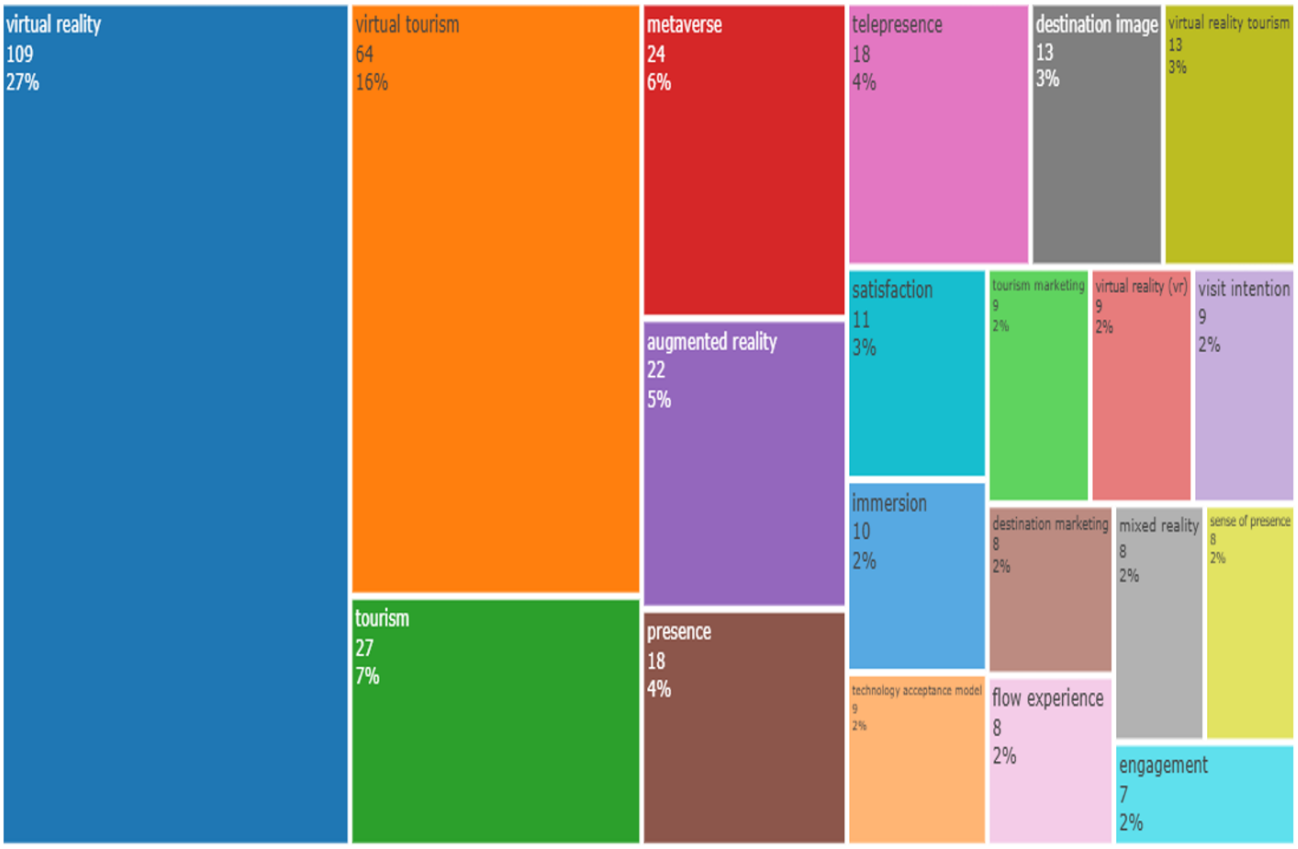
Source: BiblioShiny

3.7 Author Keyword Statistics

3.7.1 Tree-map

Figure 6 is a tree-map illustrating the 20 most often occurring author keywords, ordered accordingly. In order to create a tree-map of frequently used words the author keywords were used which best represent the content of the article from their perspective. The most frequent words that were used in the studies include virtual reality, virtual tourism, tourism and metaverse. On the contrary, the words presence, satisfaction, flow experience, engagement, visit intention, authenticity, destination image and others were used less frequently, possibly due to the fact that the associations between these concepts are still being established in this particular area of research. These might be considered viable avenues for further research in this area.

Figure 6: **Treemap**

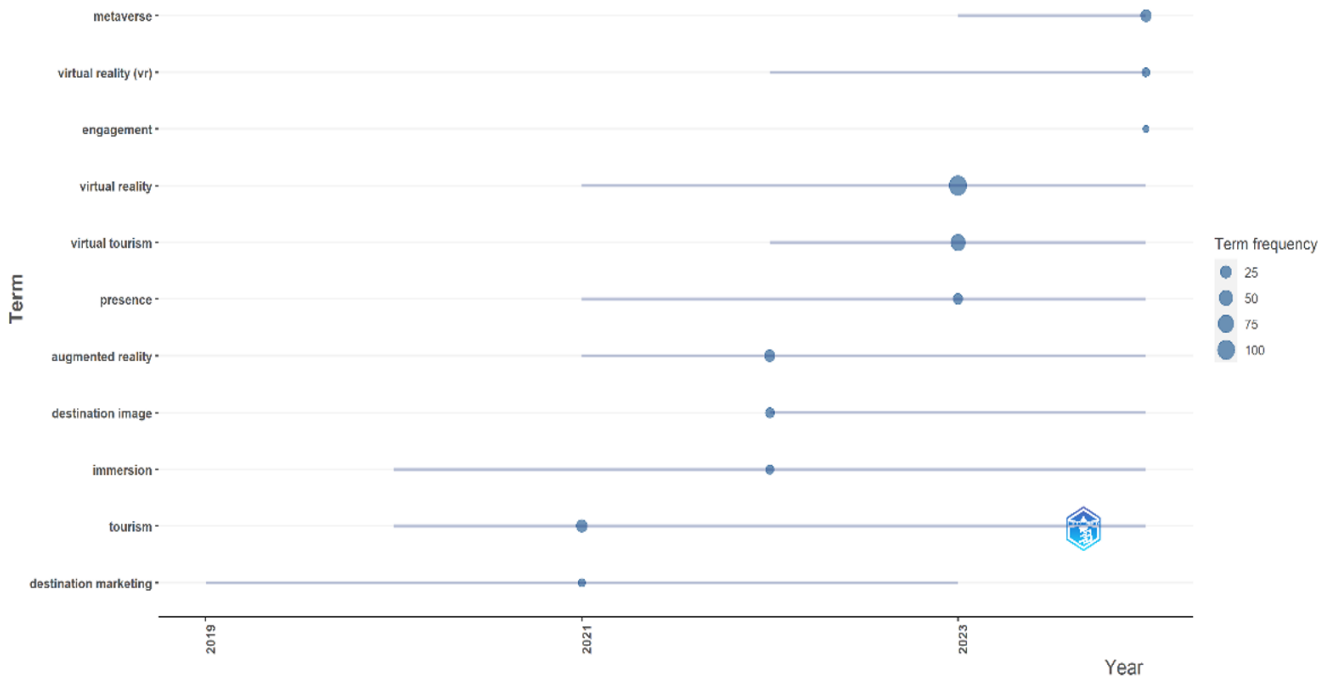


Source: BiblioShiny

3.7.2 Trend Topics

The analysis of trend topics reveals a strong and evolving scholarly interest in concepts such as metaverse, virtual reality (VR), engagement, presence, immersion, and destination image, particularly from 2021 onwards.

Figure 7: **Trend Topics**



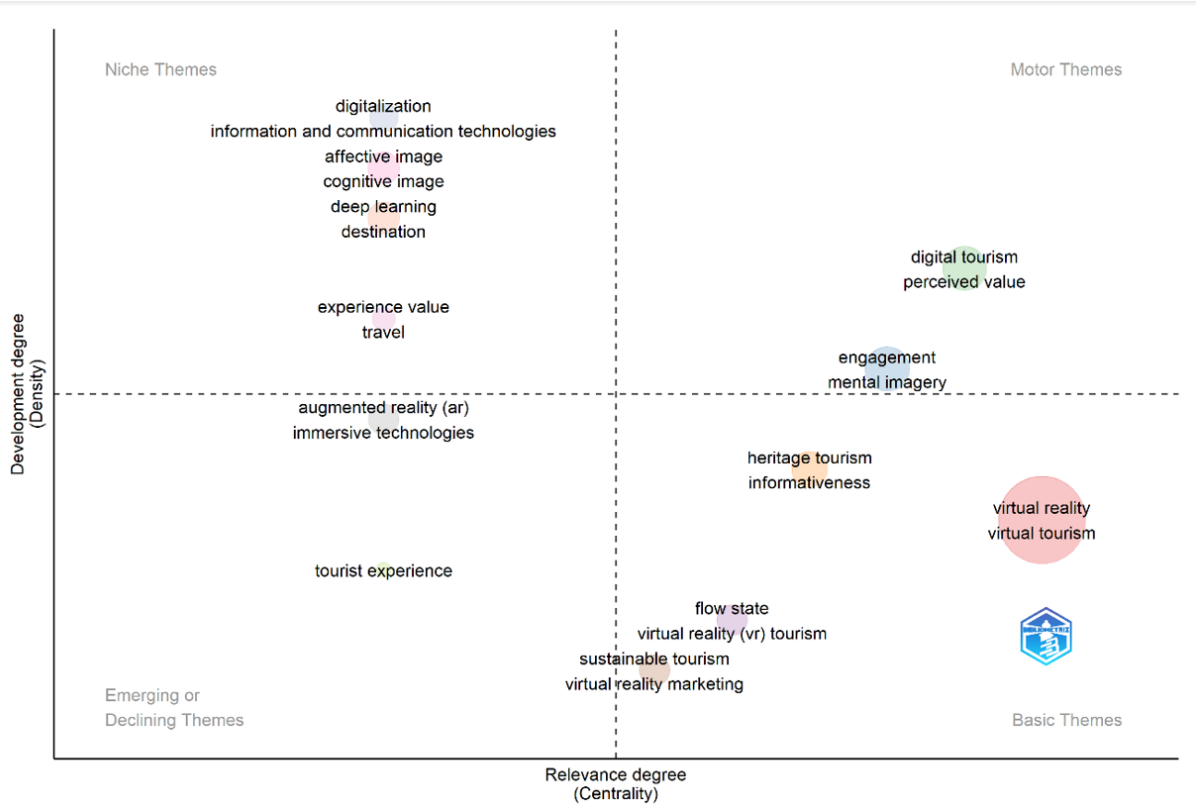
Source: BiblioShiny

The prominence of these terms suggests that immersive technologies are increasingly being positioned at the core of tourism research, not only as tools for enhancing destination marketing but also as enablers of customer experiences that go beyond physical boundaries. Notably, terms like virtual tourism and engagement highlight a shift from technology-centric discussions toward consumer-centric outcomes, emphasising the psychological and experiential dimensions of virtual interactions. For future research, this trend underscores the need to examine how antecedents of VR shape the flow state, ultimately fostering customer engagement and strengthening the intention to visit physical destinations. Our proposed model, which integrates VR antecedents leading to flow, flow leading to engagement, and engagement driving visit intent, aligns with these emerging themes and provides a structured pathway for understanding how virtual environments can be strategically leveraged to influence consumer behaviour in tourism.

3.8 Thematic Map

Scientific mapping approaches include creating thematic maps that demonstrate the conceptual framework of a certain study subject. The thematic map (Figure 8) is a network analysis that shows word occurrence to summarise scientific findings, significant themes and patterns associated with a certain subject. Thematic mapping categorises the studies in a specific area into four distinct categories of themes (Jain et al., 2022). Thematic maps illustrate themes by the way of clusters, with centrality reflecting the domain's importance in the study field and density showing the theme's degree of development (Cobo et al., 2011). The present study uses the authors' keywords to discover the fundamental conceptual framework of the topic.

Figure 8: **Thematic Map**



Source: BiblioShiny

Higher centrality and density are characteristics associated with topics located in the upper-right quadrant, which makes them developed and important themes for the area of study, which are crucial for understanding the basic core concepts related to the domain. These include digital tourism, engagement, mental imagery, and perceived value. Themes that exist in the upper-left quadrant demonstrate high centrality and low density, indicating they are extensively developed and isolated or niche themes. These could focus on specific subtopics or emerging areas of study that have not been thoroughly explored, providing valuable insights into previously unexplored aspects of the topic. These themes include digitalisation, information and communication technologies, cognitive and affective image, deep learning, destination, experience value. Themes centred within the lower-left quadrant with a low density as well as low centrality are regarded as emerging or declining themes, showcasing the limited development of such themes. These themes include augmented reality, immersive technologies and tourist experience. However, the lower-right quadrant offers essential and intersecting themes which include virtual reality, flow state, heritage tourism, sustainable tourism, as highlighted in Figure 8, that could potentially be important for the field of study but need more exploration. These themes often go unnoticed but play a crucial role in integrating different areas of interest and connecting multiple themes. Through these comprehensive insights, this study focuses on developing a conceptual model reflecting the effect of virtual reality antecedents on flow state and customer engagement and further on visit intention.

3.9 Highlights of Key Studies on Virtual Tourism

Table 2 presents the highlights of key studies in the literature on virtual tourism, highlighting the theory, constructs, and context.

Table 2: **Highlights of Key Studies on Virtual Tourism**

STUDY	THEORY	METHOD	CONTEXT	CONTRIBUTION TO FRAMEWORK	IDENTIFIED GAPS
(Sousa et al., 2024a)	Technology-Organisation-Environment (TOE) theory	Qualitative	Explores the barriers to Virtual Reality (VR) adoption within the tourism industry using a qualitative approach through interviews	Enhances the TOE model by contextualising it with qualitative insights by identifying four key barriers (technological, organisational, individual, and environmental), thus enriching its explanatory power for understanding real-world barriers to the adoption of emerging technologies in service industries	Focus on adoption, technological readiness, or system-level barriers. Psychological states such as flow, engagement, immersion remain underexplored
(Bilynets et al., 2024)	Unified theory of acceptance and use of technology (UTAUT2)	Quantitative	Examines behavioural intentions and actual usage of virtual tourism (VT) by integrating UTAUT2 with travel risk perceptions, past behaviour, and willingness to pay for VT experiences	Includes risk perception, experience, and participation in VT experiences when payment is required	
(Rasul et al., 2024)	Technology Acceptance Model (TAM)	Quantitative	Explores how potential tourists engage with immersive representations of a destination. Focuses on understanding whether VR tourism can psychologically and behaviourally engage viewers and drive their intention to physically visit	Extends the TAM by embedding it within a broader engagement-based framework. Distinguishes between psychological engagement (emotional involvement, mental focus) and behavioural engagement (actions like sharing or exploring more), and finds that only psychological engagement significantly mediates the relationship between VR experience and intention to visit	Include emotional engagement but less exploration of hedonic dimensions in a systematic manner. The gap exists in integration of hedonic aspects with immersion/flow and engagement. Furthermore, the difference between psychological and behavioural engagement is explicit, but lack of exploration of flow and engagement as mediators
(Wei et al., 2022)	S-O-R model	Qualitative and modelling	To create a new conceptual framework to understand the unique characteristics of virtual tourism experiences (VTE)	Proposes a virtual tourism experience-specific model using the S-O-R framework, highlighting unique stimuli (entertainment, education, escapism, esthetics, connection), organism factors (synchronicity, telepresence, participation, customisation, emotion), and behavioural responses. Introduces the virtual servicescape as a key construct involving host, customers, and technology	
(Flavián et al., 2021)	Theory of Technological Mediation	Experimental	Focuses on how technological embodiment affected emotional reactions and how it subsequently affects engagement in a hotel-based virtual reality context	Highlights the mediating role of emotion and psychological engagement, reinforces the importance of immersive technologies in shaping behavioural outcomes	
(Flavián et al., 2019)	S-O-R paradigm	Quantitative	Examines how a customer's pre-experience (immersion, sensory stimulation) with a destination is impacted by the level of technological embodiment (high: VR Head Mounted Displays, medium: mobile, low: desktop PC), which in turn influences engagement and behavioural intention	Incorporates tourism type (active/passive) as a moderator, enriching the S-O-R framework	

STUDY	THEORY	METHOD	CONTEXT	CONTRIBUTION TO FRAMEWORK	IDENTIFIED GAPS
(Yuan & Hong, 2024)	SOR framework	Quantitative	Explores the impact of virtual reality on individuals' tourism experiences and their subsequent behavioural intentions, while also considering the contextual factors that may influence these relationships	Reveals that novelty seeking acts as a moderator, strengthening the link between enjoyment and flow. Integrates immersive technology constructs (presence, enjoyment) with flow and behavioural outcomes and highlights VR's potential as an effective tool in tourism marketing and experience design during the decision-making phase	The role of flow is underexamined with respect to the connecting antecedents and outcomes
(Yang et al., 2022)	S-O-R model, Technology Acceptance Model, Theory of Technology Readiness	Quantitative	Evaluates a model based on the SOR architecture that incorporates visitors' virtual tourism experience	Demonstrates how the flow experience in virtual tourism can positively shape perceived usefulness and ease of use while reducing feelings of technical discomfort. It integrates elements from the S-O-R and TAM models, highlighting flow as a key factor in shaping tourists' adoption and consumption intention in virtual tourism	
(Kim & Ko, 2019)	Telepresence theory, flow theory	Experimental	To look at how media type, vividness, interactivity, telepresence, sports involvement, and rivalry influence viewers' flow experience, as well as the impact of flow state of experience on satisfaction in VR-based sports spectatorship	Integrates media, user, and content factors into a serial mediation and moderated mediation framework. Demonstrates how VR facilitates flow and satisfaction beyond traditional media	
(Babolian Hendijani & Jaszus, 2024)	Diffusion of Innovation (DOI) Theory and Self-Determination Theory (SDT)	Qualitative and conceptual	Exploring the factors influencing the virtual food tourism adoption intention	Integrates DOI and SDT to examine both intrinsic and extrinsic motivators for the adoption of virtual food tourism. Also, proposes a mediation pathway of extrinsic motivators	Aesthetic, visual realism factors are examined in isolated manner with a focus on brand-related outcomes. Further need to examine the visual elements with customer-based outcomes like flow and engagement.
(Hou & Pan, 2023)	Computer-vision approach	Mixed-method (Quantitative and Qualitative)	Aims to advance research on visual material in the tourist and hospitality industries, especially by employing a computer vision technique to quantitatively measure the aesthetics of realistic hotel pictures and, as a result, investigate how photo aesthetics impact engagement	Highlights the influence of aesthetic visual content (thumbnails and managerial photos) on engagement through reviews and ratings. Reinforces the value of imagery and aesthetics in shaping cognitive responses by taking hotel price as a moderator	
(Atzeni et al., 2022)	S-O-R theory framework	Quantitative	Investigates the role of object-based and existential authenticity in non-immersive virtual heritage tours	Studies authenticity in terms of its dimensions in shaping cognitive and affective responses, which influences satisfaction, attachment, and visit intention	
(Orús et al., 2021)	EPI Cube, Theory of Technological Mediation	Experimental	Investigates how viewing content with varying levels of perceived factual realism (real or digital) while using devices with varying degrees of embodiment (Head-mounted displays or HMDs) during extended reality experiences evoke feelings of presence, ease of imagination, and visual appeal, as well as intentions to book the hotel room	Underscores presence as a key driver in shaping pre-travel behavioural outcomes, reinforcing the importance of imagery and visual appeal in a virtual environment. Shows that technological embodiment moderates how content realism impacts user responses	

STUDY	THEORY	METHOD	CONTEXT	CONTRIBUTION TO FRAMEWORK	IDENTIFIED GAPS
(Hamid et al., 2023)	Theory of Planned Behaviour (TPB)	Quantitative	Assessing behavioural intentions for virtual tourism during COVID-19 through the lens of TPB	Enhances TPB by incorporating perceived security, thereby offering a more contextually grounded understanding of consumers' behavioural intention	Majority of studies evaluate the adoption intention or brand-related outcomes, which highlights the need for examining how engagement translates to actual visit intent
(Lee et al., 2020)	Information system (IS) success model, Attitude-behaviour theory	Quantitative	Identifies VR quality factors and examines their impact on consumers' behavioural intentions in tourism	Application of IS Success model in VR tourism, emphasising the importance of quality-driven design in virtual destination platforms, which influence attitudes and telepresence, ultimately shaping behavioural intention	
(Bae et al., 2020)	Brand Equity Theory	Quantitative	Determines the factors influencing satisfaction with respect to mixed reality experiences at "cultural and artistic visitor attractions", as well as the impact of those factors on brand loyalty	Demonstrates how the experiential qualities of mixed reality, like interactivity and vividness, foster affective responses such as immersion and enjoyment, which in turn contribute to brand-related outcomes, including brand awareness and loyalty	

Source: Authors' Compilation

Across the reviewed studies, several gaps emerge: research remains heavily focused on adoption, technological readiness, and system-level barriers (Sousa et al., 2024a; Bilynets et al., 2024; Lee et al., 2019), while user-centred constructs such as flow, hedonic value, and psychological engagement are comparatively underexplored (Rasul et al., 2024; Yuan & Hong, 2024). Although emotional engagement has been examined, the integration of hedonic, aesthetic, and imaginative aspects into frameworks of flow and engagement remains limited (Flavián et al., 2021; Babolian Hendijani & Jaszus, 2024; Hou & Pan, 2023). Many studies remain centred on immediate adoption or brand-related outcomes, leaving downstream behaviours like revisit intention, loyalty, or actual visit conversion less examined (Atzeni et al., 2022; Bae et al., 2020; Hamid et al., 2023). Furthermore, while diverse contexts such as food tourism, sports, and hospitality have been explored (Kim & Ko, 2019; Hou & Pan, 2023), a more systematic integration of these insights with behavioural models such as TAM, TPB, UTAUT2, and S-O-R is required to capture the psychological and experiential processes underpinning virtual tourism (Yang et al., 2022; Orús et al., 2021). Furthermore, while existing research offers valuable insights into technological features and users' emotional responses, limited attention has been given to understanding how individuals derive hedonic and experiential value from virtual tourism in ways that promote deeper engagement and flow.

4. VIRTUAL TOURISM: HEDONIC INFORMATION SYSTEMS (HIS) AND FLOW THEORY PERSPECTIVE

Hedonic information systems (HIS) research reflects on users' acceptance of new technology as a self-fulfilment goal rather than merely functional utility they derive. HIS prioritise leisure activities, emphasises the pleasurable aspects of using information systems, and advocates extended rather than efficient utilisation (van der Heijden, 2004). The elements of HIS model include perceived ease of use, perceived usefulness and perceived enjoyment. As described by van der Heijden (2004), IS are hedonic if they inspire users' fantasies or elicit emotional reactions such as delight, envy, or terror. Contrary to utilitarian IS, which offer users instrumental value by serving as a tool to attain external goals, hedonic information systems give self-fulfilling value. The HIS model aligns well with the nature of virtual tourism because these platforms are primarily experiential. Users engage with virtual tourism for pleasure, entertainment, and emotional resonance. Csikszentmihalyi (1975) developed the optimal experience theory, also known as the flow theory, which is a holistic sensation that people feel when they act with total involvement. The flow state in virtual tourism technology is described as interested, engrossed, completely immersed, and concentrated on the usage of technology (Kim et al., 2017). Flow theory offers a useful lens for understanding virtual tourism experiences, as it emphasises the importance of deep psychological engagement. When users are fully absorbed, losing track of time and become deeply involved, the virtual experience can closely relate to the richness of actual travel. While HIS model helps to understand users' emotional and sensory responses, such as how much they enjoy the experience or how visually appealing they find the platform; flow theory offers a process-oriented perspective, explaining how these affective responses can evolve into a state of deep involvement or engagement, ultimately leading to certain behavioural outcomes. By bridging these two theoretical perspectives together, a more nuanced and comprehensive understanding of people getting engaged in virtual tourism experiences can be gained.

In the context of tourism, individuals' experience of flow while interacting with tourism-related videos is significantly shaped by the perceived easiness and enjoyment of navigating the content (Liu et al., 2023). Similarly, visitors' PEU of virtual reality worlds and PU of such platforms as a source of information are related to flow while exploring the virtual tourist site (Huang et al., 2013). The flow state in digital tourism technologies is characterised by deep interest, immersion, absorption and concentration in the usage of technology (Kim et al., 2017). In the context of VR tourism, immersive flow experiences contribute to engagement that further influences the visit intention (Flavián et al., 2019). Moreover, customer engagement, developed through experiential marketing activities, has a positive influence on tourists' intention to visit a destination by enhancing their experience and identification with the place (Rather, 2020). This integrative linkage of the experiential (authenticity, imagery), hedonic (enjoyment), and utilitarian (ease of use, usefulness) factors through flow and engagement mechanisms, offers a comprehensive understanding of how virtual tourism experiences shape behavioural outcomes.

5. DISCUSSION

The study aimed to consolidate and evaluate existing research literature on virtual tourism, identifying areas for further study and proposing a conceptual framework. This study thoroughly explored the current literature on virtual tourism, offering an in-depth understanding of the domain that is in line with the specified research goals and methodology. By using a systematic review methodology through bibliometric analysis, important insights have been obtained regarding trends, gaps, and prospective future research directions in the field of virtual tourism. The results, gathered from 94 documents sourced from 55 distinct sources highlight the increasing importance of investigating virtual tourism domain. The annual growth rate of 8.67% is quite remarkable, showcasing the evolving nature of virtual travel and emphasising the increasing interest and relevance of this field. The prevalence of articles released in 2023 suggests a recent increase in attention. The upward trend that has been observed can be ascribed to various factors, including technological advancements, the accelerated adoption of virtual experiences stimulated by the COVID-19 pandemic, and an enhanced emphasis on comprehending consumer behaviour within virtual environments. The country-wise contribution suggests that China is the leading contributor to the virtual tourism literature, surpassing other nations. This highlights the significance of conducting a more extensive geographical investigation within the realm of virtual tourism. The bibliometric analysis reveals that certain critical aspects such as user experience, satisfaction, and the psychological impact of virtual environments have received limited attention in existing literature on virtual tourism. These overlooked aspects, including mental imagery, flow experience, destination image and authenticity, present promising avenues for further investigation. Understanding the interplay between these concepts and their influence on virtual tourism encounters is essential for advancing the comprehension of user engagement and enhancing the overall virtual tourist experience. The emphasis on understanding customer perspectives underscores the importance of delving into aspects such as customer satisfaction, engagement, and behavioural intentions within the realm of virtual tourism. This comprehension serves as a foundation for the immersive virtual tourism experience, which integrates key elements such as enjoyment, authenticity, mental imagery, flow experience, and visit intention, through the lens of the hedonic information systems model and flow theory.

Prior studies, including Sousa et al. (2024b) and Lodhi et al. (2024), have examined virtual reality in tourism largely as a promotional tool, they overlook the psychological mechanisms underlying user engagement and satisfaction. While theories like S-O-R and the Technology Acceptance Model (TAM) have been widely used to study specific dimensions of virtual tourism experiences (Bretos et al., 2023), there remains scope to deepen understanding of the psychological mechanisms driving user engagement and satisfaction. This study integrates flow theory and the Hedonic Information Systems Model to offer a nuanced perspective that explains how factors like mental imagery, flow experience, authenticity, and enjoyment influence user engagement and intention to visit physical destinations. Ha et al. (2023) also provide valuable insights through mapping bibliometric trends and thematic developments in virtual tourism; this study adds to this by focusing on psychological and experiential dimensions, thereby enriching the understanding of user experiences. Further, Verma et al. (2022) highlight stakeholder and policy perspectives about virtual tourism, with the present study complementing this by offering a user-centric lens, exploring how engaging virtual experiences can inspire actual travel intentions.

6. IMPLICATIONS

The study's findings hold considerable significance for both academicians and practitioners. The geographical asymmetry in publications of the literature on virtual tourism underscores the importance of conducting cross-cultural studies to encompass a wide range of culturally embedded viewpoints on virtual tourism. Exploring customer experiences, satisfaction, and the influence of emerging concepts such as the metaverse can provide a comprehensive insight into virtual tourism. This study contributes to positive psychology literature by proposing a framework integrating the HIS Model and flow theory to examine how VR antecedents create an immersive experience, flow state and engagement in virtual tourism. This approach captures both the hedonic aspects of technology use, such as enjoyment, authenticity and imagery, and the psychological states that enhance immersion and engagement. By examining how users achieve intrinsic satisfaction and optimal involvement, this combined perspective provides valuable insights for designing and evaluating virtual tourism experiences. Hence, this shifts the perspective on virtual tourism from solely a promotional tool to an engaging and immersive experience that enhances positive emotional responses and overall well-being.

In practice, stakeholders in the virtual tourism industry can utilise the key themes of authenticity, enjoyment, mental imagery to improve user experiences and engagement to provide enhanced experiences using the VR technology in tourism. Tourism providers can stimulate users' interest and emotional connection with destinations by creating highly engaging and authentic virtual experiences, which may increase the likelihood of making an actual visit to the place. Virtual tourism can serve as an effective pre-trip tool by allowing users to emotionally connect with a place before physically travelling. Hence, virtual travel can effectively shape travel intentions, destination image, and preference, making it a valuable marketing and educational tool.

Virtual tourism offers powerful means to preserve and interpret historical artefacts. By using immersive technologies such as virtual reality (VR), virtual tours can enhance user engagement with heritage sites by reconstructing damaged artefacts, visualising inaccessible areas, and providing rich contextual information beyond traditional displays. Museums and heritage institutions can particularly benefit from these tools, which require continuous technological refinement to ensure meaningful and engaging visitor experiences. Beyond cultural preservation, virtual tourism supports broader sustainability goals by reducing the environmental impact associated with physical travel. It can contribute to the achievement of tourism-related UN Sustainable Development Goals (SDGs) by offering low-impact, accessible, and educational experiences (Talwar et al., 2023)virtual reality (VR. Policymakers and tourism stakeholders are encouraged to integrate virtual tourism into long-term planning through targeted strategies such as regulating access to ecologically sensitive sites via virtual platforms, incentivising the development of high-quality VR content, and supporting infrastructure that enables immersive experiences (Abidin et al., 2025). Such initiatives can promote sustainable tourism growth while ensuring equitable access, economic benefits for local communities, and the preservation of culture and heritage.

Furthermore, the study highlights the strategic relevance of investing in digital infrastructure and content development that enhances accessibility and inclusivity. Virtual tourism can be used as a low-impact, scalable solution to extend access to heritage and remote destinations for individuals with mobility constraints, financial limitations or geo-political travel restrictions. This aligns with broader sustainability and inclusion goals within national and regional tourism policies.

The study's findings underscore the potential of metaverse tourism, accessibility enhancements, and providing strategic directions for industry innovation. Additionally, geographically diversified research is needed to ensure that virtual tourism solutions cater to diverse cultural and demographic groups. The study further points to the value of leveraging artificial intelligence (AI) and machine learning (ML) to create personalised itineraries, real-time customised content, and adaptive VR experiences that respond to user preferences and emotional states. Rather than viewing virtual tourism as a substitute for physical travel, the study highlights its role as a powerful pre-trip engagement tool that can influence travel decisions or as a post-trip medium for reinforcing emotional connections with destinations. Virtual tourism has the potential to democratise access to global destinations for individuals facing disabilities, financial constraints, or geographical barriers, positioning VR as a tool for inclusive tourism. Policymakers can leverage these insights to develop guidelines and infrastructure that promote inclusive and sustainable virtual tourism experiences.

7. LIMITATIONS AND FUTURE RESEARCH DIRECTION

Although the study provides valuable insights, it is important to acknowledge its limitations. The focus on customers in the study could potentially neglect the perspectives of additional stakeholders in the virtual tourism sector, including businesses and content creators. Considering the substantial disparity in contributions between countries such as China and others, future studies may delve into comparative analyses, investigating cultural subtleties and differences in virtual tourism inclinations and behaviours across various regions.

Understanding consumer behaviour in virtual tourism, particularly in the light of emerging technologies such as the metaverse, holds great potential for further research. Investigating how users engage with and adjust to these technologies can help shape the creation of more immersive and captivating virtual tourism experiences. To enhance the insights obtained from the bibliometric analysis in terms of themes, the authors provide some questions for further research. Based on the thematic structure and trend topics presented in Figure 7 and 8 and insights from recent literature, several important directions for future research are evident. Aspects such as flow, enjoyment, place attachment, and behavioural intentions have emerged as conceptually significant yet empirically underexplored, indicating the need for deeper investigation into user-centred psychological processes in virtual tourism contexts. Additionally, themes such as virtual tourist experience, mental imagery, and social inclusion remain relatively underdeveloped, despite their potential to enhance the design and effectiveness of immersive tourism platforms. While core constructs like virtual reality tourism, authenticity, and visit intention demonstrate strong thematic centrality, their integration with experiential frameworks remains limited. To address these gaps, future research should explore how emotional engagement, system interactivity, and inclusive design features jointly shape user experience and behavioural outcomes. Accordingly, the following research questions are proposed to guide future research across key thematic domains including user experience, cognitive and emotional engagement, authenticity, metaverse environments, and accessibility in virtual tourism.

Table 3: **Future Research Questions**

Theme	Research Questions
Heritage Tourism	• How can virtual tourism experiences preserve and promote tangible and intangible cultural heritage? • How do virtual heritage experiences affect tourists' intention to visit actual sites?
Sustainable Tourism	• What role does virtual tourism play in balancing economic benefits with environmental conservation in destinations? • How can VR support sustainable tourism policies and stakeholder collaboration?
Metaverse	• What are the ways to create virtual tourist experiences that encourage community engagement along with valuable relationships in the metaverse? • Which ethical factors should be taken into account when it comes to virtual tourism within a metaverse setting, specifically in relation to privacy of data and virtual identity?
Immersion	• How does immersion shape user satisfaction, engagement, and revisit intention? • How can factors such as realism, interactivity, presence influence the immersive experience in virtual tourism?
Destination Marketing	• How can VR-based marketing campaigns influence tourists' perceptions, destination image, and visit intention? • How can immersive VR tourism marketing reduce the perceived risks associated with travel decisions?
Customer/ User Experiences	• How do elements like interaction, usability, and interface design affect the satisfaction of users with their overall virtual travel experiences? • How would technological breakthroughs such as artificial intelligence (AI) and machine learning (ML) elevate personalised virtual tourist experiences for users?
Authenticity	• Which aspects affect consumers' perception and assessment of the authenticity of virtual travel encounters, and how does authenticity impact their feelings of attachment to the destination? • How can virtual reality serve as a means of conserving and fostering cultural heritage and legitimacy in the context of virtual tourism?
Mental Imagery	• What is the impact of mental imaging approaches, such as guided visualisation or narrative storytelling on users' perception of being fully engaged in virtual tourist experiences?
Others: People with disability(s) and social inclusion	• What are the specific difficulties encountered by those with disabilities when it comes to accessing and fully enjoying virtual tourist experiences? How may these be addressed by using adaptive technology and inclusive design? • What are some ways in which virtual tourism efforts might support accessibility and social inclusion for seniors and people with disabilities?

Source: Authors' Construction

Future research on virtual tourism should focus on enhancing inclusivity, authenticity, and engagement across diverse user groups. Investigating customer experiences, metaverse interactions, authenticity perceptions, and mental imagery techniques will provide insights into designing more immersive and meaningful virtual tourism experiences. Additionally, AI and ML can be leveraged to develop personalised itineraries, adaptive VR content, and real-time customisation, improving user satisfaction. Virtual tourism should not be seen as a replacement for physical travel but as a complementary tool that enhances trip planning and reinforces emotional connections post-travel. Further studies should also examine its role in democratising access for individuals facing disabilities, financial constraints, or geographical barriers. Policymakers can utilise these findings to develop inclusive and sustainable virtual tourism frameworks that address ethical concerns, accessibility challenges, and cultural preservation.

DECLARATION STATEMENT

In preparing this research paper, the author(s) used Quillbot, ChatGPT, Grammarly, and Zotero for enhancing the clarity of structure of the sentences, and to cite the references. Following the use of these tools/services, the author(s) have reviewed and edited the content as necessary and take full responsibility for the content of the published article.

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