

Technology Adoption: Trends and Future Directions within Augmented Reality and Virtual Reality Framework in Tourism and Hospitality

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Abstract

The purpose of this study is to provide a view of the current state of augmented reality (AR) and virtual reality (VR) technology adoption/acceptance studies in tourism and hospitality research using bibliometric & thematic mapping analysis. 232 studies were collected from Web of Science. According to the findings, AR/VR adoption studies began in 2012 and peaked in 2025. Keywords such as metaverse, metaverse tourism, virtual tourism, behavioural intention, and presence were mostly used keywords in recent studies. The co-citation analysis results revealed that Hair, Kim, Venkatesh, Davis, and Huang were the top co-cited authors. According to thematic mapping analysis results, technology acceptance and adoption stand out as the core theme. AR-based cultural heritage value, with its low link strength and frequency of occurrence, had a potential to create a niche topic. The intensity of acceptance-centered theories remained consistently high after 2020, showing that literature became more focused on understanding user acceptance, adoption intention, and use behavior. Experience-centered theories played a supporting role with a limited but consistent presence. This study provides an overview of the literature and was conducted to identify potential gaps and emerging trends. In this regard, it can serve as a guide for future research.

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INTRODUCTION

Virtual reality, also known as VR, and augmented reality, or AR, apps have been developed and distributed for their extensive possibilities in entertainment and education (Marto et al., 2022). Identifying the benefits of AR/VR in enhancing users' experiences (Bec et al., 2021), they have risen in popularity in the tourism and hospitality industries (Ye et al., 2020; Carlisle et al., 2021). AR is a subset of virtual environments and has critical benefits, such as combining virtual and real objects, and enabling real time interaction for the users (Azuma, 1997; Arici et al., 2019). By overlaying computer-simulated contents like three-dimensional (3D) visuals and avatars on the user's direct field of view via a multimedia device, AR provides an immersive experience that enhances the actual condition (Mohanty et al., 2020). On the other hand, VR encapsulates the potential of bringing people's minds and fantasies. Thus, it has dominated the progress from a unique technology primarily enjoyed within gamers to the sphere of daily reality (Tussyadiah et al., 2018). Virtual reality is considered as an remarkable innovation for the hospitality and tourism industries. It can manipulate the senses, creating the illusion of physical presence within interactive, computer-generated 3D settings (Ijsselsteijn and Riva, 2003; Nayyar et al., 2018). These two technologies share the capability to display 3D objects in a realistic and interactive manner. In contrast, while the environment in VR technology is entirely virtual, virtual objects exist in the real world in AR technology. Thus, these technologies enable visitors unfamiliar with a specific area to have a genuine and accurate experience, thereby enhancing tourist satisfaction (Chung et al., 2015).

AR and VR are also ushering in a new paradigm, piquing the interest of both marketing experts and customers (Egger and Neuburger, 2020). According to Zarantonello and Schmitt (2023), AR/VR are widely regarded as the most exciting interfaces for facilitating the consumption of experiential services. Critical properties of AR/VR technology, such as interactivity, presence, immersion, and vividness, have a positive impact on tourism experience (Lee et al., 2020), allowing tourists to be more satisfied with virtual environments that share the core principle of tourism (Fan et al., 2022). According to Beck and Egger (2018), the future of tourism lies in fully immersive VR technology.

Continuous creativity sourced by curiosity is a must in tourism, which can be prompted by the development of technology (Putro, 2015). AR/VR are the novice technologies directing the latest developments in technology (Ercan, 2020). Technological advancements have been proven to have a clear and significant effect on tourism and hospitality (Guttentag, 2010). In essence, they started to shape the current literature. The number of studies on AR/VR adoption in tourism and hospitality has been growing recently. Studies on museums (Jung et al., 2016; Lee et al., 2020; Camps-Ortueta et al., 2021), theme parks (Jung et al., 2015; Wei et al., 2019), and destination management and marketing (Griffin et al., 2017; Neuburger et al., 2018) come to the fore. Furthermore, scholars have been conducting a considerable amount of studies on tourism marketing and management. However, the increase in the number of studies doesn't provide a proper understanding of the research field. Accordingly, the main aim of the research is to collect studies on AR/VR adoption or acceptance in tourism and hospitality and systematically map through bibliometric and thematic mapping analysis. By doing so, this study can contribute the research field by visualizing the structural and evolutionary dynamics as well as emerging themes, research focus and unexplored research areas. Since no study has been reached on the research topic, this study is an attempt to provide a guide for future research.

Literature Review

AR/VR Technologies: Implications for Tourism and Hospitality

Advances in technology have profound impacts (Guttentag, 2010). Since the new technologies provide comprehensive information on the actual visit, customers can optimize the value of their time and money and can easily detect the challenging circumstances (Buhalis and Foerste, 2015). Furthermore, tourists can participate in both real and virtual experiences thanks to new technologies, particularly mobile technologies. This happens during all three stages of the travel process: before the trip, on-site/during the trip, and after the trip (Neuhofner et al., 2012). In the past, socio-economic commitments, group influence, family responsibilities, and cultural environment perceptions were the key components of the decision-making process for a traveller. With the introduction of digital tools, the hidden factors of decision-making process have been revealed. Mapping customer preferences using a virtual assistant has forever changed the decision-making process (Zsarnoczky, 2017). Moreover, the main features of such technologies become vital in tourist behaviours and experiences. By overlaying 3D or 2D graphics on the actual view, AR allows users to communicate without being fully immersed, making the technology preferable (Kounavis et al., 2012). Personal privilege presumption and multifaceted sensory perception are dynamics generated by AR technology (Shabani et al., 2018). Thus, AR provides tailored information to the priorities of individual tourists. Furthermore, it makes possible to increase the interactivity with the real world. AR presents numerous opportunities to add value by giving visitors a fresh, cutting-edge way to discover unfamiliar territory (Cranmer et al., 2018). Additionally, utilizing AR opens up a variety of promotional tools. It brings destinations to life, lets visitors know what to expect, and assists in planning and decisions (Hassan and Jung, 2018). According to Chung et al. (2015), AR improves the transmission of information about destinations and creates enjoyable and stimulating tourist experiences. As a result, many tourism organizations have embraced AR technology in order to entice more visitors.

VR is regarded as an exciting contemporary technological innovation. It is appraised as a pioneer in the development of novel tourism experiences aimed at providing data, leisure, education, ease of access, and historic preservation. Simultaneously, the advancement of VR technology provides benefits to destinations, hospitality enterprises, and tourist spots at all phases of the customer journey (Beck et al., 2019). Experiencing interstellar trips to imaginary worlds is now possible with the use of VR. In other words, people can be wherever they want to be or travel anywhere with the use of applications or wearable devices, mainly depending on VR technologies (Tussyadiah et al., 2018; Israel et al., 2019). VR is originally established on the sense of “presence” and “immersion”. Defined as the physical configuration of VR, immersion concentrates on embracing the user into a defined and envisaged environment. Presence, on the other hand, encourages users to believe that the virtually created world is real (Neuburger et al., 2018). VR has unlimited potential to actualize mass visits to real destinations. Due to its capacity to generate immersive experiences and convey the feelings of distant locations, VR has a significant opportunity for destination marketing (Griffin et al., 2017). Additionally, user-friendly and affordable VR devices have been available in the market for some time now (Lee et al., 2020). Accordingly, destination management organizations can easily simulate the transfer of the burden caused by the heavy load in a specific destination to the areas with limited use, which also facilitates the strategic management (Pestek and Sarvan, 2020). Furthermore, VR has a significant influence on users’ choices and perception through interactive elements and immersion.

Studies on AR/VR Adoption in Tourism and Hospitality

Digital technologies have been around quite some time and improving rapidly in tourism and hospitality research (Martínez-Moles et al., 2022). In the context of tourism, the process for the digital transformation has been complicated as the necessary services must be vibrant, interactive, and entertaining. In one of the early studies, García-Crespo et al. (2009) underlined that comprehensive value-added services based on technology were necessary in the tourism sector. Immersive technologies has dominated the industry and AR/VR technologies are now revolutionizing how tourists interact with travel and tourism-related goods and services (Loureiro et al., 2020). A wide range of application fields, such as entertainment, marketing, education, and management in tourism have adopted AR/VR technologies, leading to an increase in the number of studies (Nayyar et al., 2018). Further, these technologies have been well received in the tourism and hospitality sectors, since consumers can now test intangible tourism products using AR/VR (Yung and Khoo-Lattimore, 2019), which can be evaluated as one of the key factors in the increase in the number of studies.

Looking at the previous studies on AR/VR, they mainly focused on the technological aspects, neglecting the process and adoption (Loureiro et al., 2020). However, recent studies have highlighted the user experiences generated by the adoption of AR/VR (tom Dieck et.al., 2018). In their study, Griffin et al. (2017) determined that adopting VR technology in a specific destination generate positive feelings towards the area and it would be a great remedy for the destination marketers. Mascho and Singh (2014) have concluded that adopting virtual technologies would be less expensive and have the ability to offer a personalized experience compared to traditional marketing tools. tom Dieck et al. (2018) have emphasized the significance of adopting innovative technologies and their influential roles in tourist reservation behavioural patterns. have underlined that VR in cultural heritage enables users to easily visit historical sites and enjoy teleportation (Mercimek and Bulbul, 2025). Furthermore, the adoption of virtual guides or AR in tour guiding is becoming common in museums. Many studies in the literature place a special emphasis on the use of AR/VR in museums or cultural heritage sites (Oyelude, 2018; Southall et al., 2019).

There are a number of systematic review and bibliometric articles on AR/VR studies in tourism and hospitality (Pratisto et al., 2022; Lodhi et al., 2024; Wut and Ng, 2026). Each of them is critical for determining the state of the literature today and creating an agenda for the future. However, none of these studies has solely focused on the adoption of AR/VR in tourism and hospitality. Yet, this study aims to contribute the research field by concentrating on the adoption dimension. Aware of the fact that development of new technologies is an important step. However, the adoption of these technologies by the users is crucial to understand the process. Furthermore, the number of the adoption studies has been increasing, conducting a review has become a must to reveal the literature gaps and contribute the future projection. In this study, a bibliometric mapping and thematic analysis was conducted in order to reveal the current status of the AR/VR adoption studies in tourism and hospitality literature. Accordingly, this study can be a guide for future research to identify the potential literature gaps, as well as the future trends. Within the scope of the study, the paper specifically seeks to answer the following research questions:

1. What are the trends in AR/VR adoption studies?
2. What are the main topics of AR/VR adoption studies ?
3. Which studies received the most citations of AR/VR adoption studies?

4. Which authors received the most citations of AR/VR adoption studies?
5. Which journal received the most citations of AR/VR adoption studies?
6. What are the main author clusters of AR/VR adoption studies?
7. What are the motor and niche themes of AR/VR adoption studies?
8. How have the thematic structures of AR/VR adoption studies evolved over time?
9. How has the theoretical background of the AR/VR adoption studies evolved over time?

Methodology

Bibliometric mapping and thematic mapping analysis methods were used in the study. Bibliometric mapping is a widely accepted method for examining large amounts of scientific data (Donthu et al., 2021). Visualization, empowered by bibliometric analysis, allows for the recognition and analysis of research structure. In order to visualize the obtained data from the WOS, VOSViewer program was used. Being easy to use and providing a visual map which can be easily identified the relatedness of items (Van Eck and Waltman, 2010), the program is preferred in many bibliometric studies in different field of research (Pelit and Katircioglu, 2022). Furthermore thematic mapping was used in the study. Thematic mapping is performed to visualize the main themes in a research field, the relationships between these themes, and the conceptual structure of the field, thereby revealing the maturity level of the subject and its core and emerging themes. To analyse the data, Python from Google Colab was utilized. Thematic mapping was executed via a bibliometric workflow utilizing Python within the Google Colab environment. Co-word analysis and grouping methods were applied to author keywords and abstracts; the resulting themes were then interpreted by the researcher. It should be noted that thematic mapping analysis were conducted to support bibliometric analysis results.

Data Collection and Analysis

The data collection process was performed on 08.01.2026 in the WOS database. Since adoption was broadly defined to include not only technology usage intentions, but also behavioral intents prompted by technology-mediated experiences, the terms as “Augmented Reality” OR “Virtual Reality” OR “AR” OR “VR” AND “Technology Acceptance” OR “Technology Adoption” OR “Technology Acceptance Model” OR “TAM” OR “Unified Theory of Acceptance and Use of Technology” OR “UTAUT” OR “UTAUT2” OR “Theory of Planned Behavior” OR “TPB” OR “Theory of Reasoned Action” OR “TRA” OR “Technology Readiness and Acceptance Model” OR “TRAM” OR “Expectation Confirmation Model” OR “ECM” OR “Diffusion of Innovations” OR “Diffusion of Innovation Theory” OR “Self-determination Theory” OR “SDT” OR “Stimulus Organism Response” OR “SOR” OR “Flow Theory” OR “Flow Experience” OR “Uses and gratifications theory” OR “UGT” OR “Value-based Adoption Model” OR “VAM” OR “Innovation Resistance Theory” OR “IRT” AND “Tourism” OR “Hospitality” were inserted into WOS database to filter the studies on AR/VR adoption in tourism and hospitality fields. The keywords were determined based on the works by Han et al., 2019; Yung and Khoo-Lattimore, 2019; Bretos et al., 2024; Lodhi et al., 2024; Shukla et al., 2024.

293 articles were collected in the initial phase. Collected articles were filtered in terms of document type and articles and early access were selected for further analysis. The results were filtered by the language type and English

articles were filtered. In total, 232 studies were selected for bibliometric analysis and analysis were conducted using VOSViewer. Citation analysis was performed using WOS website. The followed procedure is shown in Figure 1.

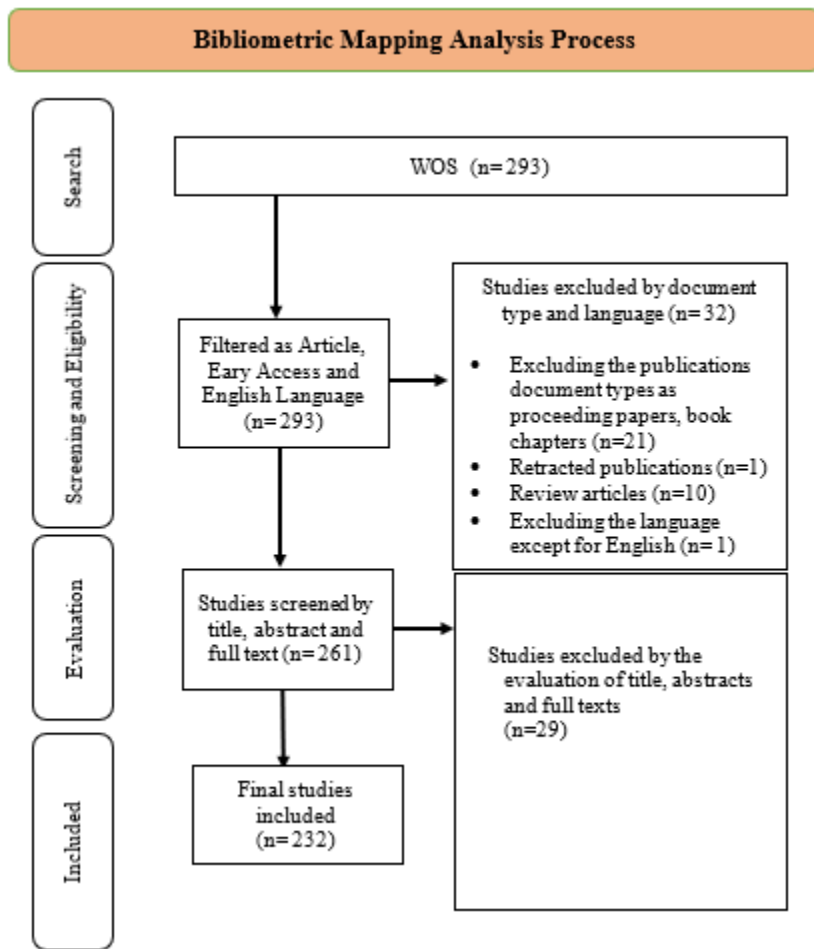


Figure 1. Bibliometric mapping analysis steps

Findings

Descriptive Data on Collected Studies

The earliest study dated back 2012. Between 2012-2017, the number of the studies was limited. However, the number began to rise in 2018 and peaked in 2025, indicating that technology adoption studies have become a trending topic over time. The growing tendency may be related to the rapid invention and accessibility of AR/VR technology after 2018. Furthermore, it is important to highlight that the increase in studies could be attributed to Covid 19. Since implemented lockdowns forced travelers to find new ways rather than participating in authentic tourism experiences (Keles and Katircioglu, 2025). As a result, it is possible to conclude that, as the number of users grows, so do research concentrating on technology adoption. The change over the years can be observed in Figure 2.

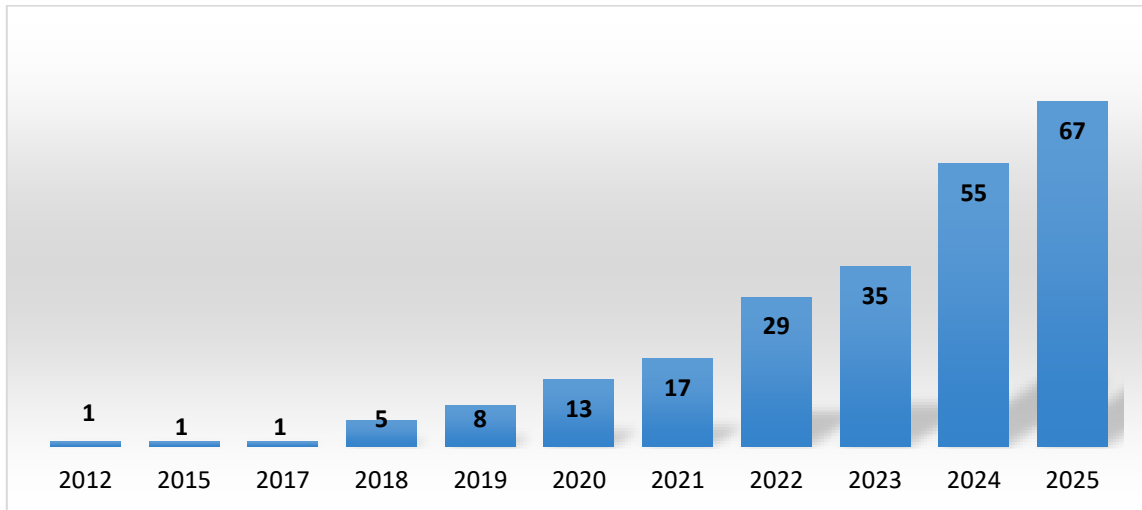


Figure 2. Distribution of publications by years

Studies were also categorized according to the index. The majority of the selected studies were SSCI (55%), followed by ESCI (27%). This indicates that the research field has achieved significant visibility and acknowledgment in prominent international journals. The prevalence of SSCI-indexed publications signifies the academic advancement and theoretical growth of the research field. Figure 3 shows the index data of the studies.

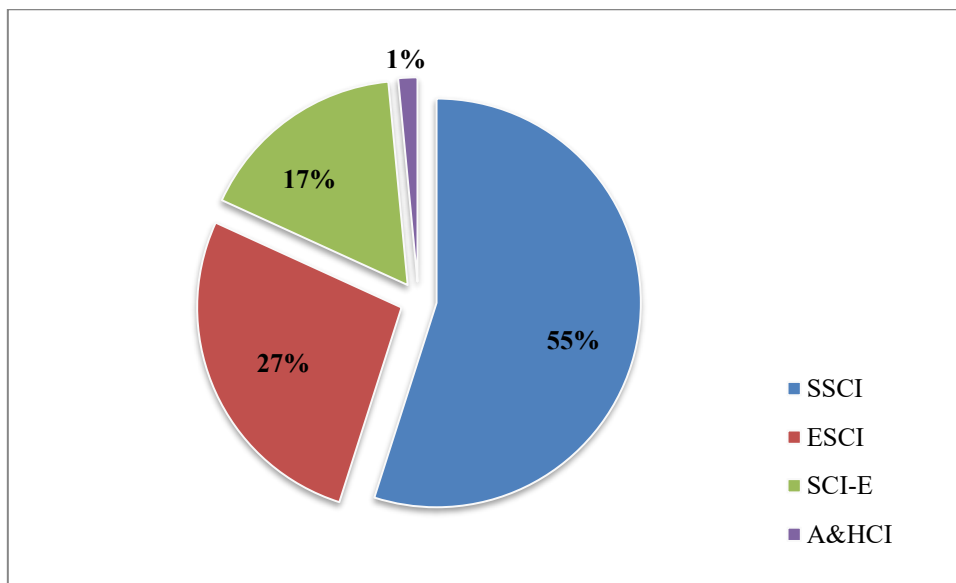


Figure 3. Distribution of publications by WOS index

Main Topics and Current Situation of AR/VR Adoption in Tourism and Hospitality

To find out the most frequently used terms in the abstracts, the number of the occurrences was determined 10. The number of the terms selected was determined 110. Use (f=176), attitude (f=118), adoption (f=98), destination (f=82), and TAM (f=75) were the terms having the highest occurrences, indicating the strong focus on technology acceptance constructs. Furthermore, four clusters were observed. The created visual map is in Figure 4. Literature is largely shaped around the axes of technology acceptance, user attitude, and perceived ease of use. In particular, the fact that the use, attitude and adoption have both high frequency and high relevance values can be interpreted that AR/VR applications in the tourism context are still being explained using TAM-based models.

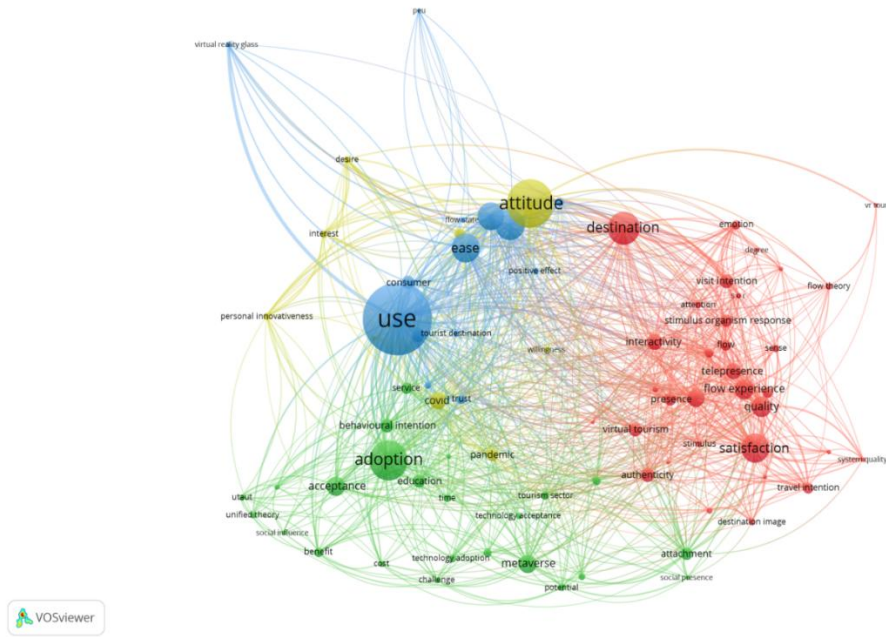


Figure 4. The most frequently used terms in abstracts

The analysis was repeated to reveal changes in word preferences over time. The change in word choices can be seen clearly in Figure 5. The following terms, “metaverse”, “presence”, “quality”, and “tourism experience” emerge as one approaches the yellow cluster that represents the most recent overlay visualization. These terms reflect an increasing scholarly focus on immersive and experience-based aspects of technology adoption in tourism research. In other words, it may indicate a structural transformation in technology adoption studies. While initial studies concentrated on usability and acceptance-related characteristics, more recent research focuses on user immersion, experienced presence, and overall experience quality. This may be strongly related to the growth of immersive digital worlds.

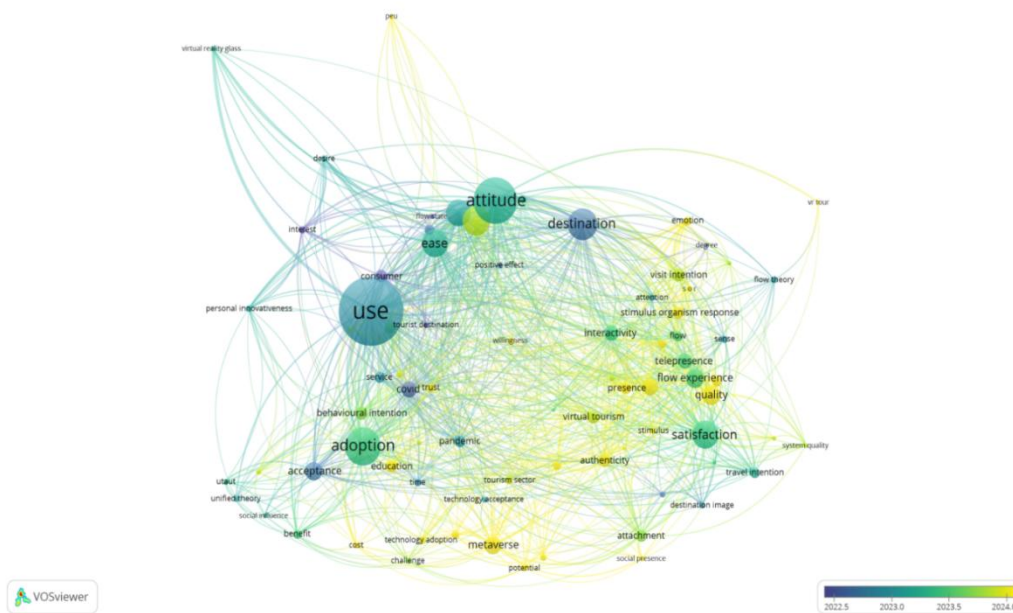


Figure 5. The word choice alteration over time

The most used keywords in abstracts were also determined using VOSviewer. When the number of occurrences was determined to be 5, the number of keywords appeared to be 39. Technology acceptance model (f=25), tourism (f=25), flow experience (f=16), virtual tourism (f=16), metaverse (f=14) were the most used keywords in AR/VR adoption studies. The created visual map is in Figure 6.

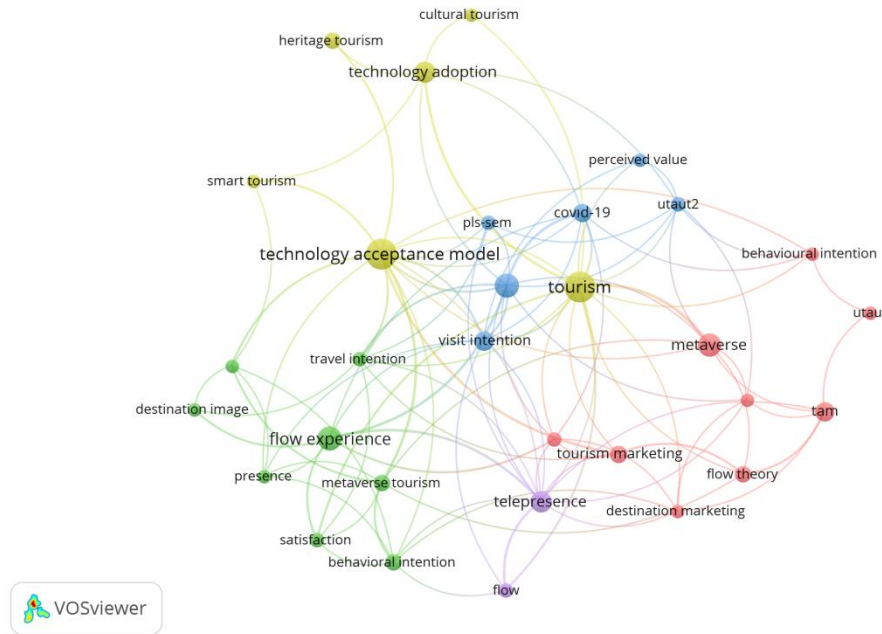


Figure 6. The most commonly used keywords in the studies

The analysis was repeated, the keywords “metaverse”, “metaverse tourism”, “virtual tourism”, “behavioural intention” and “presence” were included in the yellow cluster which can be an early sign of research shift in AR/VR adoption studies. The integration of VR and metaverse has created a new research axis in recent studies. The created visual map is in Figure 7.

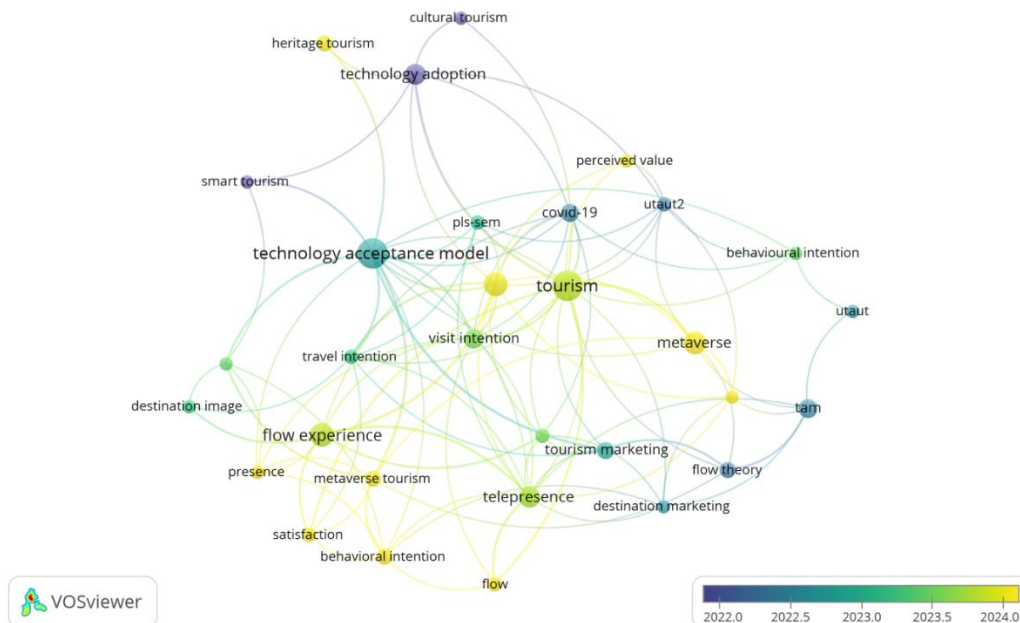


Figure 7. Changes in keyword distribution by year

Using the WOS website, the most-cited studies in AR/VR adoption were also determined. The list of the top-cited studies is given in Figure 8.

Authors	Title of the study	Journal	Citations
Kim, MJ; Lee, CK and Jung, T	Exploring Consumer Behavior in Virtual Reality Tourism Using an Extended Stimulus-Organism-Response Model	Journal of Travel Research	859
Chung, N; Han, H and Joun, Y	Tourists' Intention to Visit a Destination: The Role of augmented Reality (AR) Application f or a Heritage Site	Computers in Human Behavior	391
Kim, MJ and Hall, CM	A Hedonic Motivation Model in Virtual Reality Tourism: Comparing visitors and non-visitors	International Journal of Information Management	335
Dieck, MCT and Jung, T	A Theoretical Model of Mobile Augmented Reality Acceptance in Urban Heritage	Current Issues in Tourism	298
Chung, N; Lee, H; (...); Koo, C	The Role of Augmented Reality for Experience-Influenced Environments: The Case of Cultural Heritage Tourism in Korea	Journal of Travel Research	274
An, S; Choi, Y and Lee, CK	Virtual Travel Experience and Destination Marketing: Effects of Sense and Information Quality on Flow and Visit Intention	Journal of Destination Marketing & Management	209
Talwar, S; Kaur, P; (...); Dhir, A	Digitalization and Sustainability: Virtual Reality Tourism in a Post Pandemic World	Journal of Sustainable Tourism	195
Jung, TH; Lee, H; (...); Dieck, MCT	Cross-cultural Differences in Adopting Mobile Augmented Reality at Cultural Heritage Sites	International Journal of Contemporary Hospitality Management	185
Li, T and Chen, Y	Will Virtual Reality be a Double-edged Sword? Exploring the Moderation Effects of the Expected Enjoyment of a Destination on Travel Intention	Journal of Destination Marketing & Management	154
Flavián, C; Ibáñez-Sánchez, S and Orús, C	Integrating Virtual Reality Devices into the Body: Effects of Technological Embodiment on Customer Engagement and Behavioral Intentions toward the Destination	Journal of Travel & Tourism Marketing	145

Figure 8. The most cited studies

In the study, citation analysis and co-citation analysis were also performed. To find out the top-cited journals, a citation analysis was performed by selecting citation analysis and source option in VOSViewer program. The minimum number of documents was set at 1, and the minimum number of citations for sources was set at 10. The number of the journals was determined as 60. With 1236 citations, Journal of Travel Research was the top-cited journal in AR/VR adoption studies in tourism and hospitality. Further, Journal of Destination Marketing & Management (475 citations), Current Issues in Tourism (438 citations), and Sustainability (395 citations) were the most-cited journals respectively. Citation analysis result is shown in Figure 9.

Bibliometric Coupling

The bibliometric coupling analysis is based on the number of shared citations between two texts or authors. It demonstrates similarities between the documents' or authors' knowledge sources (Kessler, 1963). The stronger the bibliographic coupling between two documents or authors, the more similar their intellectual streams are in the field of research (Van Eck and Waltman, 2014). In this study, the authors' number of document was set at 2, and the number of citation was 5. 57 authors were selected. Jung (5 documents & 1278 citations), Kim (2 documents & 1200 citations), Lee (2 documents & 1072 citations), Chung (4 documents & 875 citations), and dieck (3 documents and 577 citation) are the most influential authors in AR/VR adoption studies. The created visual map is in Figure 11.

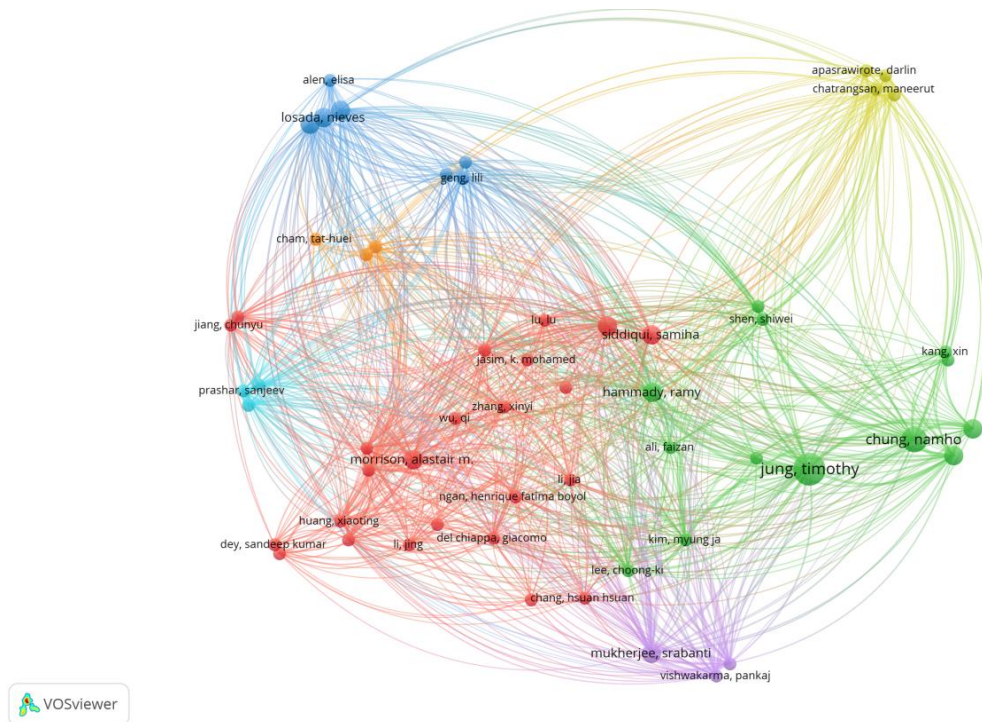


Figure 11. Bibliometric coupling

Emerging Themes and Evolution of AR/VR Adoption Studies

To support bibliometric data, thematic mapping was also carried out. The same data set obtained from WOS was used in the analysis. First, the author keywords (DE) and keyword plus (ID) columns for the papers were merged, the texts were converted to lowercase, and punctuation marks, numerical expressions, and stop words that added no semantic value were deleted.

Figure 12 provides thematic mapping analysis results. According to the obtained findings, “technology acceptance and adoption” stands out as the main theme with the strongest connectivity and the most frequency of occurrence. It shows that theoretical frameworks including the TAM, TPB, and UTAUT have largely shaped research on AR/VR adoption in the tourism literature, and that this theme serves as the conceptual core of the field. AR technologies & information systems” can be categorized as one of the fundamental themes of the discipline. It examines the technical infrastructure and scope of application, laying a strong basis for research on adoption. Accordingly, this is related to the acceptance literature. With a moderate connection strength and frequency of occurrence, “consumer satisfaction & destination image” and “experience & behavioral responses” establish the fundamental topics of the field. In comparison, with its low link strength and frequency of occurrence, “AR-based

cultural heritage value” provides a niche topic. This finding suggests that although a few studies have addressed the usage of AR technology in cultural heritage experiences with adoption orientation, it has the capacity to be a major research subject in the future. This refers to the expansion of technology acceptance studies into specific application areas.

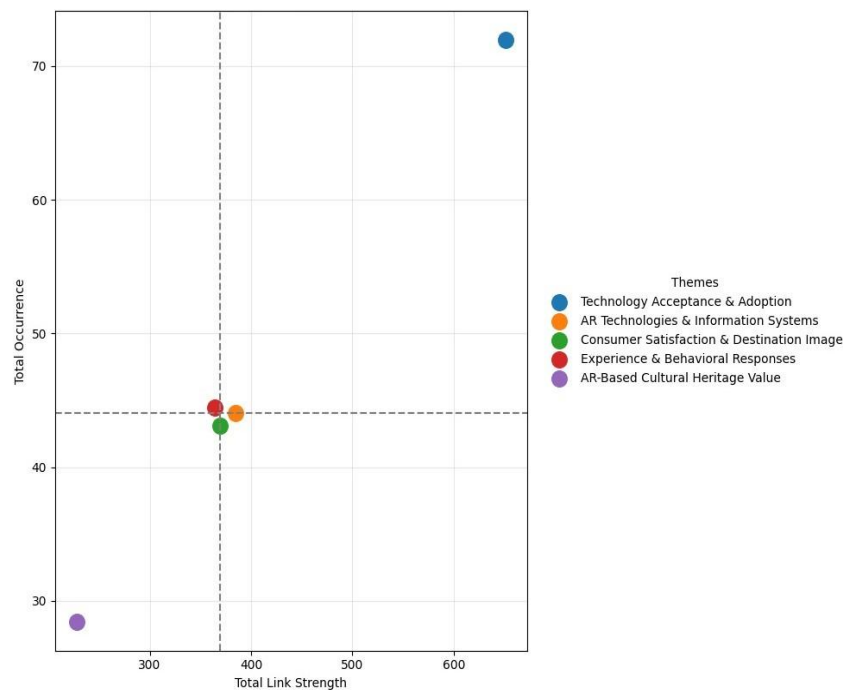


Figure 12. Thematic mapping of AR/VR adoption studies in tourism and hospitality

Thematic evolution analysis was used to find out themes that arose over time in the literature. Using keywords and expressions in the collected data, topic clusters were created; expressions reflecting related concepts were sorted under high-level topics. The themes were standardized based on their total frequency of occurrence across time, and their temporal alterations were investigated. According to Figure 13, the thematic development of AR/VR adoption studies showed that “Technology Acceptance and Adoption” shows a strong rise, especially following 2015, and has maintained a more steady research intensity in following years (Figure 13).

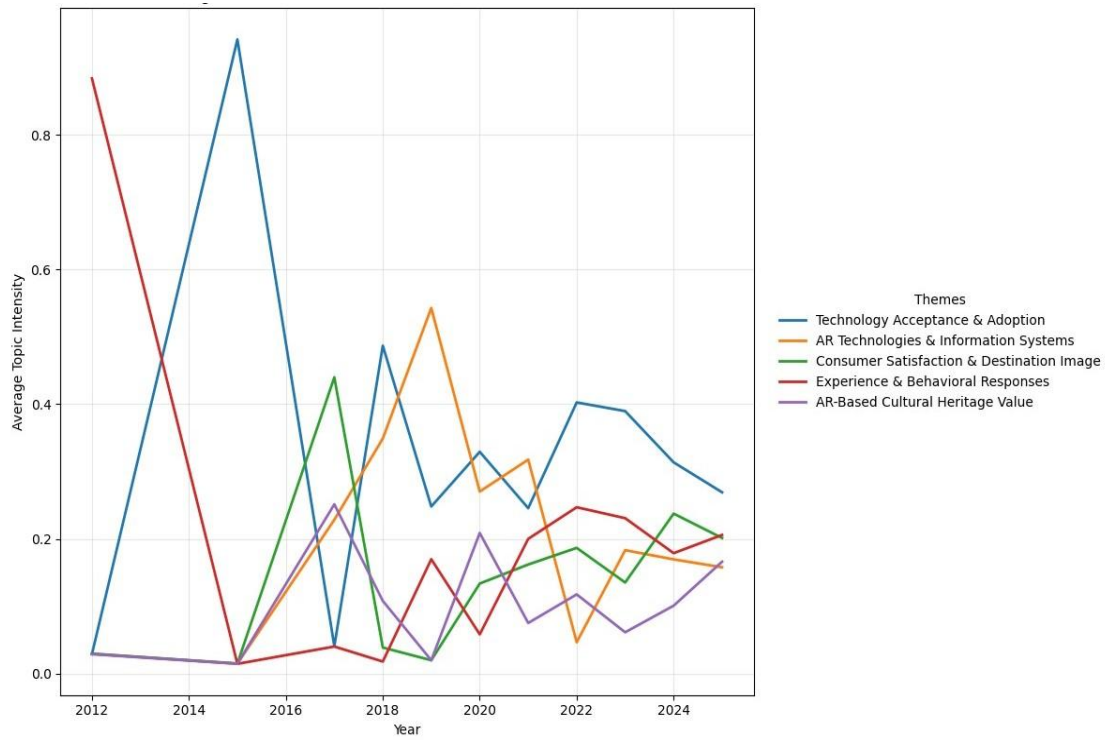


Figure 13. Thematic evolution of AR/VR adoption studies in tourism and hospitality

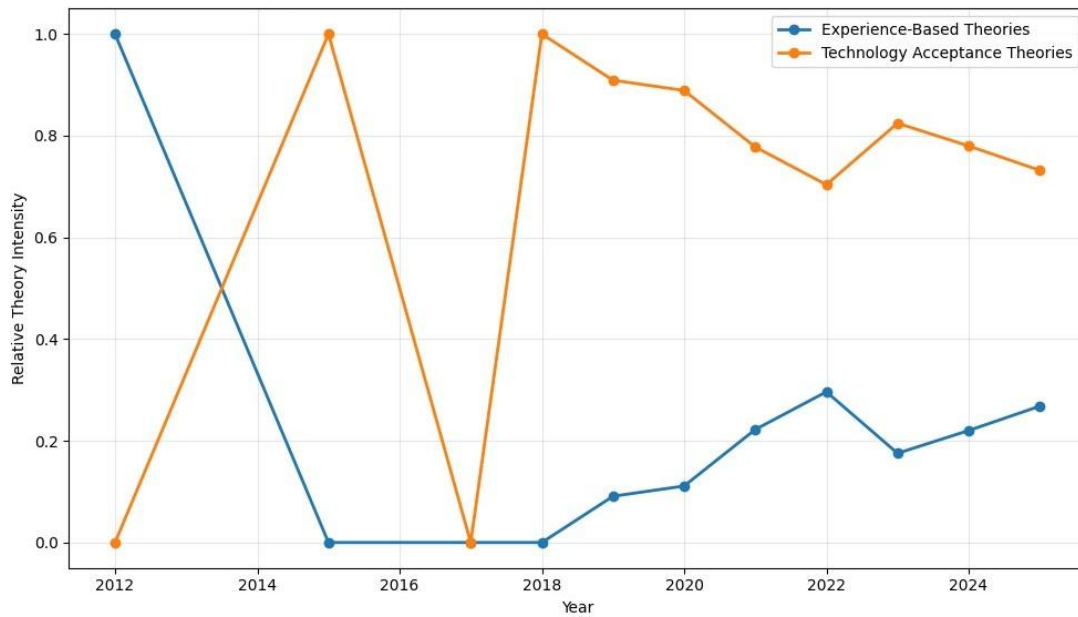


Figure 14. Temporal evolution of dominant theoretical frameworks

According to Figure 14, technology acceptance theories has been dominating the literature. The majority of technological acceptance-centered theories remained consistently high after 2020, showing that the literature became more focused on understanding user acceptance, adoption intention, and usage behavior. Experience based theories played a supporting role during the same time period, with a limited but consistent presence.

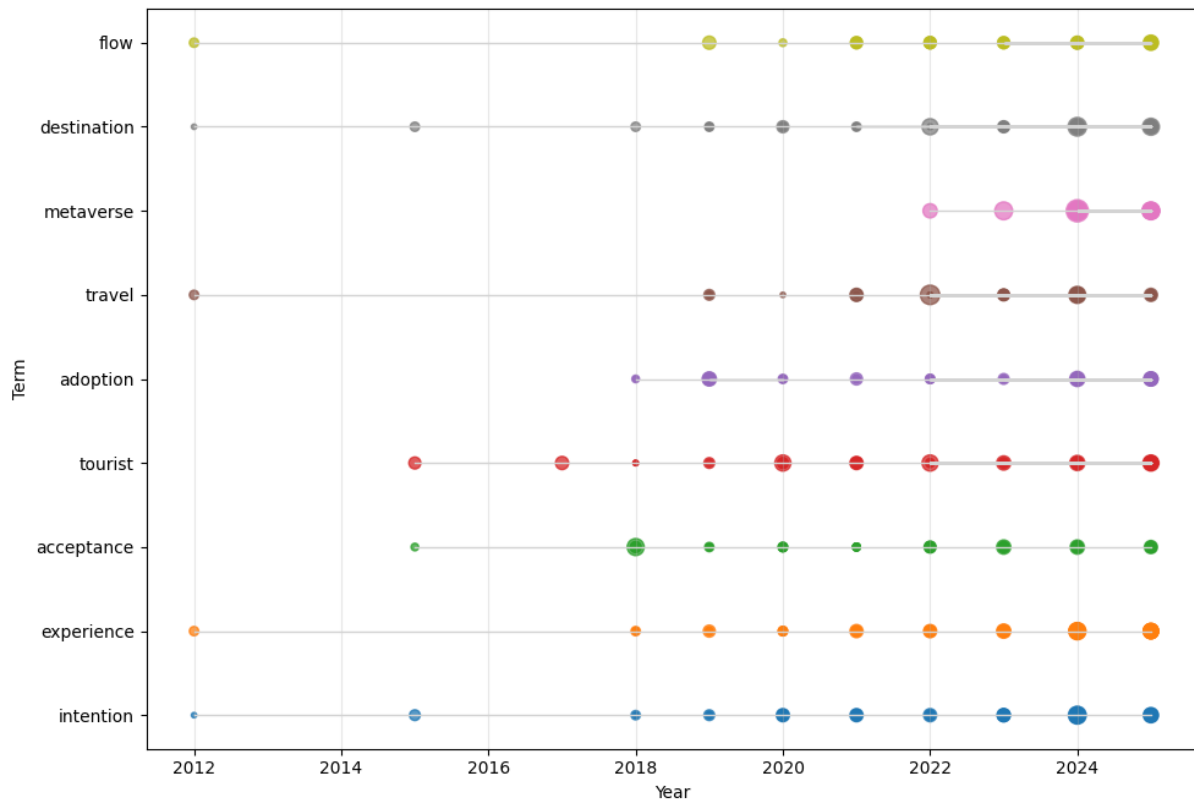


Figure 15. Trend topics in AR/VR adoption studies

Figure 15 demonstrates that the study focus in AR/VR literature has shifted over time. Similar to the bibliometric mapping analysis results, basic concepts like destination and travel were common in early research, user-focused terms like acceptance, intention, experience have gained prominence since 2018. Furthermore, the findings indicate a tendency in the adoption studies after 2020 which can be linked to the pandemic effect. Literature indicates that Covid 19 triggered the adoption and use intention of the digital tools (Ball et al., 2021; Sousa et al., 2023) which may explain the obtained result. Furthermore, the rise of the metaverse concept after 2022 demonstrates that the field is shifting toward experience-based. These findings indicate that AR/VR adoption literature is changing from a technology-centered to experience-based form.

Conclusion & Discussion

It is aimed to determine the current state and identify research trends and potential literature gaps of AR/VR adoption studies in tourism and hospitality research. Study findings show that AR/VR adoption studies have been increasing since 2018. This can be interpreted as the ongoing scholarly interest on the topic which is also stressed by the studies in the literature (Lodhi et al., 2024; Wei, 2019). Furthermore, this can be linked to the pandemic effect. Because of the pandemic, global restrictions have compelled people to seek alternate experiences, such as virtual tours, which facilitate the incorporation of AR/VR. According to Mohanty et al. (2020) AR and VR have proven to be creative tools capable of providing touchless, visual and aural experiences, ensuring both customer satisfaction and safety. As a result, they may have profound influence on the future of tourism, which is also emphasized by certain studies in the literature (Guttentag, 2021; Lodhi et al., 2024). However, Yung and Khoo-Lattimore (2019) found that both the tourism industry and customers were hesitant to accept virtual experiences over real experiences which could also explain the increase in the number of studies in the pandemic period. The pandemic effect along with scepticism of customers could have resulted in a tendency to make more research on understanding technology

acceptance and user intentions.

The citation analysis results demonstrate that terms such as use, attitude, adoption, destination and TAM have the highest occurrences. Furthermore, metaverse, presence, quality, and tourism experience are the terms which has commonly preferred in the recent studies. Moreover, the keywords alteration over time analysis indicate that metaverse, metaverse tourism, virtual tourism, behavioural intention and presence are keywords, recently preferred. These findings are also aligned with the thematic mapping analysis findings. It can be inferred that AR/VR adoption studies have been matured enough to move on with the experience and behavioural aspects. This can be evaluated as an indicator of trend. The first technology-centric approaches have evolved into a sophisticated behavioral framework, emphasizing concepts like metaverse, TAM, and presence, which pertain to the tourism experience, in accordance with the research undertaken by de Lurdes Calisto and Sarkar (2024). Furthermore, in a broader sense, this is aligned with the notion that technology adoption studies have evolved from the utilization of independent technologies to more interconnected solutions within tourism (Dwivedi et al., 2022). Considering both the increase in the studies and mostly preferred keywords in the studies along with the citation intensity, it can be stated that AR/VR adoption studies in tourism and hospitality literature is moving from exploratory phase to a more advanced, experienced-focused studies. The popularity and citation potential of new topics may also be contributing factors to the increased interest, as bibliometric measures only demonstrate an increasing degree of academic consolidation and visibility. The obtained results in the study can not verify the true extent of industry-wide adoption.

AR/VR technologies have transformed many industries, including tourism and hospitality. The reflection is so rapid that keeping up with it and integrating it in current literature has become critical through top journals. The number of the top journals publishing AR/VR adoption studies is on also on the rise which is also underpinned by Loureiro et al. (2020). Furthermore, finding out the most cited journals is important in order to reveal the general tendency over the research field. Journal of Travel Research was the top-cited journal in AR/VR adoption studies in tourism and hospitality. Hair (210 citations) was the most co-cited author. Kim (193 citations), Venkatesh (188 citations), Davis (157 citations) and Huang (156 citations) were top co-cited authors respectively.

A number of theoretical contribution needs to be addressed. First, considerable number of studies are examined in the study. It offers insight on how AR/VR adoption studies are currently positioned within the research field. The number of the studies have increased and the current inquiry have advanced. The common approach to the technologies have been reshaped with the help of Covid pandemic as the rise in the number of the studies come up to the period which the lockdowns were imposed throughout the globe. Second, it can be inferred that the explanatory process of AR/VR adoption studies have been completed and the theoretical frameworks covering theories, concepts and models are on the move. In line with it, TAM is protecting its dominant position and followed by UTUAT and SOR. However, studies have started to differ theories to explain technology acceptance. Third, the preferred terms in recent studies allow us to make the assumption that the progress of AR/VR adoption rests in a more comprehensive approach that can evolve into metaverse and virtual tourism axis.

The findings obtained in the study also generates some practical contributions. Since it is difficult to follow the latest studies, this study can be a practical guide giving an overview of the AR/VR adoption studies. Following the most recent research on AR/VR adoption provides practitioners with knowledge on the complex process of user acceptance in allowing them to gain or maintain a competitive advantage (Wei, 2019). Observing research trends,

theoretical and methodological approaches practitioners can assess potentials and opportunities. Furthermore, because tourism and hospitality education has the power to mold the future workforce, it is crucial to recognize that thematic trends toward immersive experience, presence, and metaverse-related debates can be used as a curriculum development tool. Since it is anticipated that digital technologies will have a major transformational effect on the industry, incorporating the aforementioned rising themes into courses may help to better link academic training with the current digital shift.

Several limitations exist in the study, and future directions must be addressed. First, WOS is the the only data source. Future studies can use other data sources to collect data. Second, the examined studies were limited with the chosen keywords. It is important to note that the keywords were limited with AR/VR technologies accordingly, this may result in missing relevant studies. There are other technologies that fall under Industry 4.0 such as artificial intelligence (AI) or digital twins. These technologies have strong connections with AR/VR. As a result, researchers can consider these technologies to get more deeper understanding in future research. Moreover, only technology adoption or acceptance studies were examined in the study. This can also be evaluated as one of the limitation of the study. According to Pratisto et. al. (2022), combining AR/VR with other technologies can potentially improve user experience. Furthermore, technology (e.g. artificial intelligence) acceptance studies have been getting much attention in recent years (Joo, 2025). Accordingly, it should be noted that future research may concentrate on reality technologies including mixed or extended reality.

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REFERENCES

- An, S., Choi, Y., & Lee, C. K. (2021). Virtual travel experience and destination marketing: Effects of sense and information quality on flow and visit intention. *Journal of Destination Marketing & Management*, 19, 100492.
- Arici, F., Yildirim, P., Caliklar, Ş., & Yilmaz, R. M. (2019). Research trends in the use of augmented reality in science education: Content and bibliometric mapping analysis. *Computers & Education*, 142, 103647.
- Azuma, R. T. (1997). A survey of augmented reality. *Presence: Teleoperators & Virtual Environments*, 6(4), 355-385.
- Ball, C., Huang, K. T., & Francis, J. (2021). Virtual reality adoption during the COVID-19 pandemic: A uses and gratifications perspective. *Telematics and Informatics*, 65, 101728.
- Bec, A., Moyle, B., Schaffer, V., & Timms, K. (2021). Virtual reality and mixed reality for second chance tourism. *Tourism Management*, 83, 104256.
- Beck, J. & Egger, R. (2018), Emotionalise me: self-reporting and arousal measurements in virtual tourism environments, in Stangl, B. and Pesonen, J. (Eds), *Information and Communication Technologies in Tourism 2018 Proceedings of the International Conference in Joönkoöping, Sweden, 24-26 January*, Springer, Cham, pp. 3-15.

- Beck, J., Rainoldi, M., & Egger, R. (2019). Virtual reality in tourism: a state-of-the-art review. *Tourism Review*, 74(3), 586-612.
- Bretos, M. A., Ibáñez-Sánchez, S., & Orús, C. (2024). Applying virtual reality and augmented reality to the tourism experience: a comparative literature review. *Spanish Journal of Marketing-ESIC*, 28(3), 287-309.
- Buhalis, D., & Foerste, M. (2015). SoCoMo marketing for travel and tourism: empowering co-creation of value. *Journal of Destination Marketing & Management*, 4(3), 151-161.
- Camps-Ortueta, I., Deltell-Escolar, L., & Blasco-López, M. F. (2021). New technology in Museums: AR and VR video games are coming. *Communication & Society*, 193-210.
- Carlisle, S., Ivanov, S. & Dijkmans, C. (2021). The digital skills divide: evidence from the European tourism industry. *Journal of Tourism Futures*, Vol. ahead-of-print No. ahead-of-print.
- Chung, N., Han, H., & Joun, Y. (2015). Tourists' intention to visit a destination: The role of augmented reality (AR) application for a heritage site. *Computers in Human Behavior*, 50, 588-599.
- Chung, N., Lee, H., Kim, J. Y., & Koo, C. (2018). The role of augmented reality for experience-influenced environments: The case of cultural heritage tourism in Korea. *Journal of Travel Research*, 57(5), 627-643.
- Cranmer, E. E., Dieck, M., & Jung, T. (2018). How can tourist attractions profit from augmented reality?. In *Augmented reality and virtual reality* (pp. 21-32). Springer, Cham.
- de Lurdes Calisto, M., & Sarkar, S. (2024). A systematic review of virtual reality in tourism and hospitality: The known and the paths to follow. *International Journal of Hospitality Management*, 116, 103623.
- Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., ... & Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66, 102542.
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285-296. for PhD candidates and other early-career researchers. *Higher Education Research & Development*, 33(3), 534-548.
- Egger, R., & Neuburger, L. (2020). Augmented, virtual, and mixed reality in tourism. *Handbook of e-Tourism*, 1-25.
- Ercan, F. (2020). An examination on the use of immersive reality technologies in the travel and tourism industry. *Business & Management Studies: An International Journal*, 8(2), 2348-2383.
- Fan, X., Jiang, X., & Deng, N. (2022). Immersive technology: A meta-analysis of augmented/virtual reality applications and their impact on tourism experience. *Tourism Management*, 91, 104534.
- Flavián, C., Ibáñez-Sánchez, S. & Orús, C. (2019). Integrating virtual reality devices into the body: effects of technological embodiment on customer engagement and behavioral intentions toward the destination, *Journal of Travel & Tourism Marketing*, 36(7), 847-863
- García-Crespo, A., Chamizo, J., Rivera, I., Mencke, M., Colomo-Palacios, R., & Gómez-Berbís, J. M. (2009). SPETA: Social pervasive e-Tourism advisor. *Telematics and informatics*, 26(3), 306-315.

- Griffin, T., Giberson, J., Lee, S. H., Guttentag, D., Kandaurova, M., Sergueeva, K., & Dimanche, F. (2017). Virtual reality and implications for destination marketing. *Travel and Tourism Research Association: Advancing Tourism Research Globally*, 29, 34.
- Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637-651.
- Guttentag, D. (2021). Digital destinations and avatar tourists: A futuristic look at virtual reality tourism and its real-world impacts. In Yeoman, I., McMahonBeattie, U., & Sigala, M. (Eds.), *Science Fiction, Disruption and Tourism* (pp. 145-160). Channel View. <https://doi.org/10.21832/9781845418687-015>
- Han, D. I. D., Tom Dieck, M. C., & Jung, T. (2019). Augmented Reality Smart Glasses (ARSG) visitor adoption in cultural tourism. *Leisure Studies*, 38(5), 618-633.
- Hassan, A., & Jung, T. (2018). Augmented reality as an emerging application in tourism marketing education. In *Virtual and Augmented Reality: Concepts, Methodologies, Tools, and Applications* (pp. 1702-1720). IGI Global.
- Ijsselstein, W. A., & G. Riva. (2003). Being There: The Experience of Presence in Mediated Environments. In *Being There: Concepts, Effects and Measurement of User Presence in Synthetic Environments*, edited by G. Riva, F. Davide, and W. A. Ijsselstein, 4–16. Amsterdam: IOS Press.
- Israel, K., Zerres, C., & Tscheulin, D. K. (2019). Presenting hotels in virtual reality: does it influence the booking intention?. *Journal of Hospitality and Tourism Technology*, 10(3), 443-463.
- Joo, K. (2025). Warning to AI washing: a mixed-method study on the antecedents and consequences of AI washing perception towards AI-powered services in hospitality and tourism. *Current Issues in Tourism*, 1-19.
- Jung, T., Chung, N., & Leue, M. C. (2015). The determinants of recommendations to use augmented reality technologies: The case of a Korean theme park. *Tourism Management*, 49, 75-86.
- Jung, T., Dieck, M., Lee, H., & Chung, N. (2016). Effects of virtual reality and augmented reality on visitor experiences in museum. In *Information and communication technologies in tourism 2016* (pp. 621-635). Springer, Cham.
- Jung, T. H., Lee, H., Chung, N., & tom Dieck, M. C. (2018). Cross-cultural differences in adopting mobile augmented reality at cultural heritage tourism sites. *International Journal of Contemporary Hospitality Management*, 30(3), 1621-1645.
- Keles, Y., & Katircioglu, E. (2025). Virtual reality A tool for sustainable development in tourism or a treat for the future? A systematic review and a swot analysis. *Tourism: An International Interdisciplinary Journal*, 73(3), 410-428
- Kessler, M. M. (1963). Bibliographic coupling between scientific papers. *American Documentation*, 14(1), 10-25.
- Kim, M. J., & Hall, C. M. (2019). A hedonic motivation model in virtual reality tourism: Comparing visitors and non-visitors. *International Journal of Information Management*, 46, 236-249.
- Kim, M. J., Lee, C. K., & Jung, T. (2020). Exploring consumer behavior in virtual reality tourism using an extended stimulus-organism-response model. *Journal of Travel Research*, 59(1), 69-89.

- Kounavis, C. D., Kasimati, A. E., & Zamani, E. D. (2012). Enhancing the tourism experience through mobile augmented reality: Challenges and prospects. *International Journal of Engineering Business Management*, 4, 10.
- Lee, H., Jung, T. H., tom Dieck, M. C., & Chung, N. (2020). Experiencing immersive virtual reality in museums. *Information & Management*, 57(5), 103229.
- Li, T., & Chen, Y. (2019). Will virtual reality be a double-edged sword? Exploring the moderation effects of the expected enjoyment of a destination on travel intention. *Journal of Destination Marketing & Management*, 12, 15-26.
- Lodhi, R. N., Del Gesso, C., Asif, M., & Cobanoglu, C. (2024). Exploring virtual and augmented reality in the hospitality industry: A bibliometric analysis. *Tourism and Hospitality Management*, 30(1), 67-84.
- Loureiro, S. M. C., Guerreiro, J., & Ali, F. (2020). 20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach. *Tourism management*, 77, 104028.
- Martínez-Molés, V., Jung, T. H., Pérez-Cabañero, C., & Cervera-Taulet, A. (2022). Gathering pre-purchase information for a cruise vacation with virtual reality: the effects of media technology and gender. *International Journal of Contemporary Hospitality Management*, 34(1), 407-429.
- Marto, A., Gonçalves, A., Melo, M., & Bessa, M. (2022). A survey of multisensory VR and AR applications for cultural heritage. *Computers & Graphics*, 102, 426-440.
- Mascho, E., & Singh, N. (2014). Virtual tourism: Use of “Second Life” for destination marketing. *Anatolia*, 25(1), 140-143.
- Mercimek, N., & Bulbul, A. (2025). Virtual Reality for Cultural Heritage: A Systematic Review and the Proposal of the AMUX-VR Framework. *International Journal of Human-Computer Interaction*, 1-26.
- Mohanty, P., Hassan, A. and Ekis, E. (2020). Augmented reality for relaunching tourism post-COVID-19: socially distant, virtually connected. *Worldwide Hospitality and Tourism Themes*, 12(6), 753-760.
- Nayyar, A., Mahapatra, B., Le, D., & Suseendran, G. (2018). Virtual Reality (VR) & Augmented Reality (AR) technologies for tourism and hospitality industry. *International Journal of Engineering & Technology*, 7(2.21), 156-160.
- Nerur, S.P., Rasheed, A.A. & Natarajan, V. (2008). The intellectual structure of the strategic management field: an author co-citation analysis. *Strategic Management Journal*, 29(3), 319-336,
- Neuburger, L., Beck, J., & Egger, R. (2018). The ‘Phygital’ tourist experience: The use of augmented and virtual reality in destination marketing. In *Tourism planning and destination marketing*. Emerald Publishing Limited.
- Neuhofner, B., Buhalis, D., & Ladkin, A. (2012). Conceptualising technology enhanced destination experiences. *Journal of Destination Marketing & Management*, 1(1-2), 36-46.
- Oyelude, A.A. (2018), Virtual reality (VR) and augmented reality (AR) in libraries and museums, *Library Hi Tech News*, 35(5), 1-4.
- Pelit, E. and Katircioglu, E. (2022). Human resource management studies in hospitality and tourism domain: a bibliometric analysis, *International Journal of Contemporary Hospitality Management*, 34(3), 1106-1134

- Pestek, A., & Sarvan, M. (2020). Virtual reality and modern tourism. *Journal of Tourism Futures*, 7(2), 245-250.
- Pratisto, E. H., Thompson, N., & Potdar, V. (2022). Immersive technologies for tourism: a systematic review. *Information Technology & Tourism*, 1-39.
- Putro, H. T. (2015). Immersive Virtual Reality for Tourism and Creative Industry Development. The 3rd International Conference on Creative Industry, 11-12 August, Bali, Indonesia, pp. 1-6.
- Shabani, N., Munir, A., & Hassan, A. (2018). E-Marketing via augmented reality: A case study in the tourism and hospitality industry. *IEEE Potentials*, 38(1), 43-47.
- Shukla, V., Rana, S., & Prashar, S. (2024). Examining the potential of virtual and augmented reality in enhancing tourism experiences. *The Bottom Line*.
- Sousa, N., Jorge, F., Teixeira, M. S., Losada, N., Melo, M., & Bessa, M. (2023). An exploratory study about the effect of COVID-19 on the intention to adopt virtual reality in the tourism sector. *Sustainability*, 15(11), 8725.
- Southall, H., Marmion, M., & Davies, A. (2019). Adapting Jake Knapp's design sprint approach for AR/VR applications in digital heritage. In *Augmented reality and virtual reality* (pp. 59-70). Springer, Cham.
- Talwar, S., Kaur, P., Nunkoo, R., & Dhir, A. (2023). Digitalization and sustainability: virtual reality tourism in a post pandemic world. *Journal of Sustainable Tourism*, 31(11), 2564-2591.
- tom Dieck, M.C., Fountoulaki, P. and Jung, T.H. (2018). Tourism distribution channels in European island destinations. *International Journal of Contemporary Hospitality Management*, 30(1), 326-342.
- tom Dieck, M. C., & Jung, T. (2018). A theoretical model of mobile augmented reality acceptance in urban heritage tourism. *Current Issues in Tourism*, 21(2), 154-174.
- Tussyadiah, I. P., Wang, D., Jung, T. H., & Tom Dieck, M. C. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management*, 66, 140-154.
- Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523-538.
- Van Eck, N. J., & Waltman, L. (2014). Visualizing bibliometric networks. In *Measuring scholarly impact: Methods and practice* (pp. 285-320). Cham: Springer International Publishing.
- Wei, W. (2019). Research progress on virtual reality (VR) and augmented reality (AR) in tourism and hospitality: A critical review of publications from 2000 to 2018, *Journal of Hospitality and Tourism Technology*, 10(4), 539-570.
- Wei, W., Qi, R., & Zhang, L. (2019). Effects of virtual reality on theme park visitors' experience and behaviors: A presence perspective. *Tourism Management*, 71, 282-293.
- Wut, T. M., & Ng, M. L. P. (2026). Virtual Reality and Augmented Reality of Tourism Research: A Review and Research Agenda. *Journal of Quality Assurance in Hospitality & Tourism*, 27(2), 347-370.
- Ye, B. H., Ye, H., & Law, R. (2020). Systematic review of smart tourism research. *Sustainability*, 12(8), 3401.

- Yung, R., & Khoo-Lattimore, C. (2019). New realities: a systematic literature review on virtual reality and augmented reality in tourism research. *Current Issues in Tourism*, 22(17), 2056-2081.
- Zsarnoczky, M. (2017). How does artificial intelligence affect the tourism industry?. *VADYBA*, 31(2), 85-90.
- Zarantonello, L. & Schmitt, B.H. (2023). Experiential AR/VR: a consumer and service framework and research agenda. *Journal of Service Management*, 34(1), 34-55.