

AUGMENTED AND VIRTUAL REALITY IN TOURISM MARKETING: A SYSTEMATIC LITERATURE REVIEW OF ADOPTION FACTORS AND VISITOR ENGAGEMENT

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Abstract: The increasing use of Augmented Reality (AR) and Virtual Reality (VR) in tourism marketing has transformed how destinations attract visitors through immersive experiences that impact tourists' intention to visit. However, gaps remain in understanding the specific factors influencing the adoption of these technologies in tourism. This study addresses these gaps by conducting a Systematic Literature Review (SLR) to identify key factors and implications of AR and VR in tourism marketing, with a focus on their impact on tourist decision-making. A systematic search of 1,500 articles from databases such as Scopus, IEEE Xplore, SpringerLink, and Web of Science was conducted, with 50 articles selected based on journal quality and empirical relevance. The review reveals that Technology Acceptance Model (TAM) variables, including perceived ease of use, perceived usefulness, perceived enjoyment, and perceived control, are key determinants of tourists' intention to use AR and VR technologies. Extended TAM factors such as perceived immersion and interactivity also play a crucial role, particularly in fully immersive VR environments. The study differentiates between three VR simulation types (fully immersive, semi-immersive, and non-immersive) and identifies key AR factors like digital overlays, gamification, and personalization. The proposed conceptual model links these factors to tourist engagement and intention to visit. While the model provides a useful framework, further empirical validation is required.

Keywords: Augmented Reality, Virtual Reality, Tourism Marketing, Technology Acceptance Model, Visitor Intention

1. Introduction

The rapid development of Augmented Reality and Virtual Reality technologies has significantly transformed various industries, with the tourism sector being one of the most profoundly impacted (Lim et al., 2024). As competition between tourism destinations intensifies, marketers are increasingly adopting immersive technologies to offer innovative, experiential marketing solutions that capture potential visitors' attention and influence their intention to visit (Hamzah et al., 2024). Augmented Reality and Virtual Reality provide unique opportunities for destinations to showcase their offerings in ways that traditional marketing methods cannot. By offering virtual tours, interactive experiences, and sensory engagements, these technologies have the potential to significantly influence tourists' decision-making processes and their emotional connection to destinations (Rahayu et al., 2023; Zhu et al., 2023). Despite the growing application of these technologies, understanding the factors that drive their adoption by tourists remains incomplete, particularly regarding how they affect tourist engagement and behaviours (Bretos et al., 2023; Calisto & Sarkar, 2024; Rahayu et al., 2023). Virtual Reality allows users to immerse themselves fully in a computer-generated environment, enabling them to experience a destination without physically being present. This technology has been widely applied in pre-visit experiences, where tourists can explore attractions, hotels, and landscapes through immersive virtual tours. In contrast, Augmented Reality overlays

digital content onto the physical world, offering interactive maps, virtual guides, or gamified experiences during the actual visit (Hamzah et al., 2024; Javanmardi et al., 2024).

While Virtual Reality primarily supports pre-trip planning by simulating environments, Augmented Reality enhances the on-site experience, providing contextual information that deepens the connection between the visitor and the destination. However, despite the evident potential of these technologies in the tourism industry, research gaps persist in understanding the specific adoption factors that influence tourists' acceptance and engagement with these immersive experiences (Calisto & Sarkar, 2024; Rahayu et al., 2023; Yersüren & Özel, 2023; Zhu et al., 2023). Current studies tend to focus heavily on technical aspects, such as interface design, system performance, and hardware improvements. Yet, fewer studies investigate the psychological, emotional, and behavioural impacts of Augmented Reality and Virtual Reality on tourists (Kim et al., 2018; Prados-Castillo et al., 2024). This creates a gap in understanding how these technologies influence tourists' decision-making processes, their intention to visit, and their satisfaction with a destination. Consequently, Destination Management Organizations and marketers are left with limited insights on how to effectively implement these technologies to maximize tourist engagement and loyalty (Chung et al., 2015; Kim et al., 2018; Xian & Shen, 2020).

This study aims to address the gaps in current literature by conducting a comprehensive review of the adoption of Augmented Reality and Virtual Reality in tourism. The study will explore how these technologies influence tourists' psychological, emotional, and cognitive responses, providing insights into their behavioural outcomes. The Technology Acceptance Model serves as the theoretical framework for this study, positing that perceived ease of use and perceived usefulness are key factors driving technology adoption. In recent years, this model has been expanded to include additional factors such as perceived enjoyment, perceived control, and perceived immersion, which are particularly relevant to the adoption of immersive technologies like Augmented Reality and Virtual Reality (Calisto & Sarkar, 2024; Hamzah et al., 2024; Javanmardi et al., 2024; Lim et al., 2024). This study will examine these variables in the tourism context to develop a more comprehensive understanding of tourist behaviours and how these technologies influence intention to visit.

To ensure that this study follows a rigorous and systematic methodology, a structured review approach has been adopted. This approach is a structured and reproducible method designed to identify, select, and critically evaluate relevant literature on a particular topic. The literature search was conducted across major academic databases, including Scopus, Web of Science, and ScienceDirect. Keywords such as "Augmented Reality in tourism," "Virtual Reality in tourism," "tourist behaviours," "technology adoption," and "immersive technologies" were used to gather an initial pool of studies. From an initial set of a large number of articles, a multi-step selection process was applied. The first step involved screening the titles and abstracts of the identified articles. Articles that focused on non-tourism industries, or that addressed purely technical aspects without examining behavioural implications, were excluded. After this, a more detailed review of the full-text articles was conducted to evaluate their relevance to the research questions and their methodological rigor. Studies that lacked empirical data, were not peer-reviewed, or focused solely on technical elements without addressing psychological or behavioural outcomes were further excluded. This process resulted in a final selection of key articles that met all inclusion criteria.

By systematically reviewing the literature, this study aims to identify the key factors influencing the adoption of Augmented Reality and Virtual Reality in tourism, with a specific

focus on their impact on tourist engagement and decision-making. The findings will provide actionable insights for Destination Management Organizations and tourism marketers, enabling them to develop strategies that leverage these technologies to enhance tourist experiences and increase destination loyalty (Azevedo & Alturas, 2019; Li & Chen, 2019; Pestek & Sarvan, 2020; Xian & Shen, 2020). Understanding these factors will help optimize digital marketing strategies and improve the competitiveness of tourism destinations in an increasingly digitalized world. Additionally, this study aims to propose a conceptual model linking the adoption of Augmented Reality and Virtual Reality technologies to behavioural outcomes in tourism, offering a roadmap for future research (Pereira et al., 2018; tom Dieck & Jung, 2018).

The use of immersive technologies like Augmented Reality and Virtual Reality in tourism is rapidly expanding. These technologies have evolved from niche applications to mainstream marketing tools used to engage potential tourists before, during, and after their visits. Augmented Reality enhances real-world experiences by overlaying digital content, such as interactive maps or gamified elements, onto the physical environment. Virtual Reality, on the other hand, enables users to explore destinations remotely through immersive, computer-generated environments. These distinct yet complementary technologies are changing how tourists engage with destinations, making it essential to understand the factors driving their adoption (Calisto & Sarkar, 2024; Chung et al., 2015; Egger & Neuburger, 2022; Rahayu et al., 2023).

While both Augmented Reality and Virtual Reality are widely used in tourism, they serve different purposes. Virtual Reality is typically used in pre-visit experiences, allowing tourists to explore attractions or accommodations before deciding. In contrast, Augmented Reality enhances the on-site experience by providing contextual, real-time information that enriches the visitor's connection with the destination. The synergy between these technologies offers opportunities for a seamless tourist journey, from planning to on-site engagement, yet few studies have explored the combined effects of these technologies. This study seeks to fill that gap by examining both technologies in tandem and understanding their influence on tourists' behavioural outcomes.

2. Literature Review

Augmented Reality (AR) and Virtual Reality (VR) technologies have revolutionized the tourism industry by offering immersive experiences that influence tourists' decision-making and intention to visit. Empirical research has demonstrated the effectiveness of AR and VR in enhancing tourist engagement by providing interactive and sensory-rich environments. Augmented Reality, in particular, is widely used to enhance on-site experiences, with applications such as digital overlays, interactive maps, and gamified challenges offering real-time information to tourists. Research by Bretos et al. (2023) shows that AR's ability to blend digital content with physical surroundings significantly improves tourists' satisfaction and engagement, thereby increasing their likelihood of visiting a destination. VR, on the other hand, has been primarily applied in the pre-visit phase, where tourists can explore destinations through virtual tours and immersive simulations. Studies by Yersüren and Özel (2023) found that fully immersive VR experiences evoke strong emotional responses and generate a sense of presence, which is a critical factor in influencing tourists' intention to visit.

The adoption of AR and VR in tourism has been studied extensively through various theoretical models. The Technology Acceptance Model (TAM), originally developed by Davis (1989), remains one of the most widely used frameworks to explain the factors that drive tourists'

adoption of AR and VR technologies. Empirical studies have shown that Perceived Ease of Use and Perceived Usefulness are essential in determining whether tourists will use AR and VR tools. For example, Kim and Hall (2019) found that when AR applications are easy to navigate and provide useful information, tourists are more likely to use them to enhance their travel experiences. TAM has been extended to include variables like Perceived Enjoyment and Perceived Immersion, which are particularly relevant to AR and VR because these technologies provide not only functional benefits but also entertainment and engagement. Research has demonstrated that tourists who find AR and VR enjoyable are more likely to adopt these technologies, increasing their intention to visit the destination.

The Unified Theory of Acceptance and Use of Technology (UTAUT), introduced by Venkatesh et al. (2003), has also been widely applied to study the adoption of AR and VR in tourism. UTAUT integrates constructs such as Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions, which provide a more comprehensive view of technology adoption. In tourism, Performance Expectancy plays a significant role, as tourists often expect AR and VR to provide useful insights into a destination, helping them make more informed travel decisions (Guttentag, 2020). Social Influence, such as recommendations from peers or influencers, also impacts adoption, especially among younger, tech-savvy tourists. Moreover, Facilitating Conditions, such as access to necessary hardware or technical support, are crucial for widespread adoption, particularly for VR, which often requires more sophisticated equipment.

In addition to technology acceptance models, behavioural theories like the Theory of Planned Behaviour (TPB) and the Stimulus-Organism-Response (S-O-R) Model have been applied to understand how AR and VR influence tourist behaviours. TPB suggests that tourists' attitudes toward using AR and VR, as well as the social norms surrounding technology use, significantly impact their intention to adopt these technologies. Subjective norms, such as peer pressure or societal trends, are particularly influential in the adoption of AR and VR, especially in the context of social media and online travel communities (Flavián et al., 2021). Meanwhile, the S-O-R model provides insights into how virtual stimuli from AR and VR influence tourists' emotions and behaviours. For example, immersive virtual tours can evoke emotions like excitement or curiosity, which in turn increase tourists' satisfaction and their likelihood of visiting the destination in real life.

Flow Theory has been employed to examine how tourists experience deep engagement with AR and VR technologies. Flow, as described by Csikszentmihalyi (1975), occurs when users are fully absorbed in an activity, losing track of time due to a balance between challenge and skill. In tourism, AR and VR experiences that achieve a state of flow where tourists are deeply immersed in virtual environments or interactive AR features lead to higher levels of satisfaction and intention to visit. Flow Theory highlights the importance of designing AR and VR applications that offer customizable experiences, allowing tourists to adjust the challenge level and maintain control over their interactions, thus enhancing their overall experience and increasing the likelihood of revisiting or recommending the destination to others (Bretos et al., 2023; Chung et al., 2015; Egger & Neuburger, 2022; Fan et al., 2022; Jingen Liang & Elliot, 2021; Pestek & Sarvan, 2020; tom Dieck & Jung, 2018; Zhu et al., 2023).

3. Method

Systematic Approach and Sampling Technique

This study employed a Systematic Literature Review (SLR) methodology to explore the factors influencing the adoption of Augmented Reality and Virtual Reality in tourism marketing, with a specific focus on their impact on visitor engagement. The snowballing sampling technique was utilized to ensure comprehensive coverage of relevant studies, allowing the identification of additional key literature through citations and references. This approach has been tested and validated in previous tourism and technology studies, ensuring that the review follows a structured, reproducible process. The detailed steps and procedures for the search and selection of articles are described below (Fundoni et al., 2023; Rogge et al., 2024).

Search and Screening Process

To ensure a comprehensive and systematic identification of relevant studies, a multi-stage search and screening process was conducted across four major academic databases: Scopus, IEEE Xplore, SpringerLink, and Web of Science. These databases were selected for their extensive coverage of both applied and theoretical research, which is essential for understanding the adoption of Augmented Reality (AR) and Virtual Reality (VR) technologies in tourism marketing. The search strategy utilized a combination of Boolean operators to refine the search and capture studies that address both AR and VR technologies in the tourism context, with particular emphasis on adoption factors and visitor engagement.

The search was performed using a set of Boolean search terms applied to titles, abstracts, and keywords to ensure the retrieval of relevant studies. The main keywords used were "Augmented Reality" OR "Virtual Reality" AND "tourism" AND "adoption factors" OR "visitor engagement". Additional variations of these terms, such as "immersive technology" AND "tourism marketing", were also used to broaden the scope of the search. To limit the scope to recent advancements and innovations in these technologies, the search was restricted to articles published between 2010 and 2024. This time frame was selected to capture both the early development and the latest applications of AR and VR in the tourism industry.

The initial search process yielded 1,500 articles across the four databases. These articles were then subjected to a duplicate removal process, which reduced the total to 1,200 unique articles. The first stage of screening involved a title and abstract review to ensure relevance to the core research themes of AR and VR adoption in tourism marketing. Articles that focused solely on non-tourism sectors, unrelated technological innovations, or general marketing strategies without specific mention of AR or VR were excluded. This stage also applied inclusion criteria to retain articles that discussed visitor engagement, adoption factors, and marketing implications. After this stage, 500 articles remained for further consideration.

In the second stage, a more refined filtering process was applied, based on the specific categories of interest related to adoption factors and visitor engagement. Articles were classified into the following key categories:

1. **Technological Adoption Factors:** This included studies that explored variables such as perceived ease of use, perceived usefulness, and perceived enjoyment, based on the Technology Acceptance Model (TAM). Additionally, articles that extended TAM to include perceived immersion, interactivity, and control were prioritized.

2. Tourist Engagement and Decision-Making: Studies in this category focused on how AR and VR technologies influence tourists' emotional, cognitive, and behavioral engagement, as well as their decision-making process regarding destination selection.
3. Marketing Strategies in Tourism: This category captured articles that examined how AR and VR are used by Destination Management Organizations (DMOs) and tourism marketers to enhance destination branding, provide virtual tours, and create immersive experiences that lead to increased visitor intention.

Each article was carefully evaluated within these categories to ensure they directly addressed the review's objectives. Articles that discussed only the technical aspects of AR and VR, without a clear connection to tourism or marketing, were excluded. This stage reduced the number of articles to 120, which were subjected to full-text review. In the full-text review stage, further filtering was conducted to assess the methodological rigor of each study. Only articles published in high-impact, peer-reviewed journals were included in the final dataset to ensure the quality and reliability of the findings. Articles were also evaluated for empirical relevance, meaning they had to present data or theoretical models directly related to the adoption and application of AR and VR in tourism. Studies focusing on theoretical frameworks like TAM or models that analyse visitor engagement and behavioural intention to use AR and VR technologies were prioritized. After this comprehensive review, 50 articles remained.

In addition to the initial search, snowballing techniques were employed to ensure that any important studies not identified in the database searches were included. Backward snowballing involved reviewing the reference lists of the selected articles to identify earlier studies that might be relevant but were not captured in the initial search. Forward snowballing was also applied, which involved identifying articles that cited the selected studies, ensuring that the most recent and influential research was included in the review. This process yielded an additional 150 articles, which were subjected to the same screening and filtering process. However, most were either duplicates or did not meet the strict inclusion criteria, so only 10 additional studies were included, bringing the final number of articles to 50.

These 50 articles form the core of this Systematic Literature Review (SLR), providing a thorough examination of the adoption factors and implications of AR and VR in tourism marketing. They offer valuable insights into the role of immersive technologies in shaping tourist engagement and decision-making, helping to identify key opportunities and challenges for tourism marketers.

Evaluation and Selection of Studies

The selected articles underwent a detailed evaluation to ensure they aligned with the study's focus on the adoption of Augmented Reality and Virtual Reality in tourism marketing and their influence on visitor engagement. The evaluation criteria included the relevance of the study's objectives, the methodological rigor, and the depth of discussion regarding adoption factors. Articles that marginally addressed the topic or that lacked empirical or theoretical depth were excluded. The final selection of 50 articles was reviewed thoroughly to ensure they contributed meaningfully to the research questions posed by this study. An independent researcher cross-validated the inclusion of the final set of studies to minimize selection bias and ensure the accuracy of the evaluation process.

Data Extraction and Coding Process

A structured data extraction process was followed to categorize the key themes emerging from the selected articles. An Excel spreadsheet was used to tabulate and organize the data, allowing

for a systematic approach to analysis. The coding process was divided into three phases. In the first phase, the articles were categorized based on the main dimensions of the review: adoption factors and visitor engagement. The adoption factors were further subdivided into categories such as technological factors (perceived ease of use, perceived usefulness, system quality), emotional and experiential factors (perceived enjoyment, immersion, engagement), and organizational factors (destination management strategies, market orientation). In the second phase, the articles were analyzed to identify theoretical frameworks used to explain the adoption of Augmented Reality and Virtual Reality. Common theories such as the Technology Acceptance Model, Theory of Planned Behavior, and Diffusion of Innovation were identified and categorized accordingly. This phase allowed for the identification of patterns across the studies in terms of which theories were most frequently used to explain adoption behaviours in the tourism context. In the third phase, the articles were examined for visitor engagement outcomes, which were categorized into cognitive, emotional, and behavioural dimensions. Cognitive engagement included aspects such as information processing and destination awareness, while emotional engagement focused on factors like enjoyment and satisfaction. Behavioural engagement measured visitor intention to visit or revisit a destination, influenced by their interaction with immersive technologies.

Synthesis and Analysis

Once the coding was completed, the data were synthesized to provide a comprehensive overview of the adoption factors influencing Augmented Reality and Virtual Reality in tourism marketing. The synthesis also examined how these technologies impact visitor engagement across different tourism contexts, such as cultural heritage sites, nature tourism, and urban destinations. The analysis included identifying gaps in the literature, particularly in the under-researched areas of emotional engagement and long-term behavioural effects of these technologies.

This structured approach to data extraction and coding allowed for a systematic and comprehensive analysis of the literature, providing valuable insights into the adoption of Augmented Reality and Virtual Reality technologies in tourism marketing and their impact on visitor engagement.

4. Result and Discussion

In the digital transformation in the current era, the need for virtual and real technology has been widely adopted by several sectors, one of which is the tourism sector where virtual reality and augmented reality become solutions and tools as promotional media that facilitate and help their efficiency in marketing existing tourism products to be better known by the wider community. Literature issues related to virtual and augmented reality in recent years have experienced significant developments based on the concepts and needs of the current global market. In this literature review, several journal databases are needed to see the latest issues related to virtual reality and augmented reality in tourism marketing such as the Emerald, Elsevier, and WOS journal databases. Required literature from 2020 to 2024 at this time. In the results of data extraction and coding, 50 journals were found to be listed based on the index results in the journal database which will then be further analysed on each dimension and concept of virtual reality and augmented reality in tourism marketing that exist in 2020 to 2024. From the results of the final journal list obtained, it will be further described based on its concept which includes analysis units, methods, and antecedents. The list of journals in each index will be explained in Table 1 and a more detailed description in Table 2. After being

explained in each table, a further analysis will be obtained that will describe the latest issues in the development of virtual reality and augmented reality in tourism marketing according to their categories.

Table 1. List Of Journals

Journal Name	Index	Total
Tourism Management	SCOPUS Q1	4
International Journal of Hospitality Management	SCOPUS Q1	1
Journal of Hospitality, Leisure, Sport & Tourism Education	SCOPUS Q1	1
Procedia	SCOPUS Q2	1
Tourism Management Perspectives	SCOPUS Q1	1
Social Sciences & Humanities Open	SCOPUS Q1	1
Spanish Journal of Marketing	SCOPUS Q2	1
Technology in Society	SCOPUS Q1	1
European Journal of Innovation Management	SCOPUS Q1	1
European Journal of Marketing	SCOPUS Q1	1
Journal of Hospitality and Tourism Technology	SCOPUS Q1	1
Journal of Place Management and Development	SCOPUS Q2	1
Management Research Review	SCOPUS Q1	1
Spanish Journal of Marketing	SCOPUS Q2	1
Measurement: Sensors	SCOPUS Q3	1
Journal of Industrial Information Integration	SCOPUS Q1	1
Annual of Tourism Research	SCOPUS Q1	1
Heliyon	SCOPUS Q1	2
Journal of Business Research	SCOPUS Q1	1

Table 2. Current List of Research on VR/AR in Tourism Marketing

Concept	Explanation	Sample Article
Antecedent	Explanation regarding the main unit of analysis which is the aim of the research	
Orientation of tourist experience	This study tests empirical studies on respondents by looking at their orientation towards the addictive aspects and their tourism experiences in using virtual reality.	(Huang et al., 2024; Kostyk et al., 2024; Merks & Nawijn, 2021a; Oppert et al., 2023)
Tourism experience literature	An empirical study on current issues regarding the influence of VR/AR on tourism experiences	(Bretos et al., 2024; Omran et al., 2024)(Fan et al., 2022)

Concept	Explanation	Sample Article
AR/VR implementation assessment	Studies that apply models to see opportunities or advantages in AR/VR	(Do et al., 2020; Jung & tom Dieck, 2017)
Tourism business	A study assessing tourism satisfaction using AR and VR as media	(Çalışkan et al., 2023)
Tourist Satisfaction	A study assessing tourism satisfaction using AR and VR as media	(Lim et al., 2024a; Peruzzini et al., 2023)
AR/VR Acceptance	A study on the analysis of AR/VR technology acceptance towards tourism education during the pandemic.	(Shen et al., 2022)
Augmented Reality Marketing	Technology in the marketing field that uses AR	(Quan et al., 2024)
Augmented Reality and Virtual Reality Development	A study on how to design an AR application	(Anderies et al., 2023; Giraldo et al., 2024; Pranoto et al., 2023)
Travel Constraint	A study on travel barriers to behavioural intention to use VR	(Schiopu et al., 2022)
Tourism Experience	Tourism experience using AR/VR technology	(Hoang et al., 2023; McLean et al., 2023; Oppert et al., 2023; Quan et al., 2024)
Mechanism	Explanation of related variables in the implementation of VR/AR in tourism marketing	
Perceived ease of use	Acceptance of ease of use of AR/VR	(Lim et al., 2024b; Talwar et al., 2022)
Innovativeness	Factors that innovate the adoption of AR/VR technology	
Usefulness	The use of AR/VR technology in the context of tourism	
Technology Acceptance Model (TAM)	Technology acceptance theory in AR/VR implementation in tourism	(Shen et al., 2022)
Behavioral Intention	Visitors' behavioral intentions towards tourism	(Schiopu et al., 2022)
Travel Motivation	Motivation of visitors who will undertake direct tourism trips	(Schiopu et al., 2022)
Method	Research approaches used in VR/AR in tourism marketing	
Empirical	Studies that test hypotheses or answer problem statements	(Lim et al., 2024b; Shen et al., 2022)
Theoretical	Studies that test theories and/or develop theories and frameworks	(Çalışkan et al., 2023; Giraldo et al., 2024; Jung & tom Dieck, 2017;

Concept	Explanation	Sample Article
<i>Context</i>	Research objects used in the study	Merkx & Nawijn, 2021a; Shen et al., 2022)
Region	A study that conducts research in a particular region (country or area)	(Jung & tom Dieck, 2017)
Hotels	Analysis of visitor satisfaction visiting hotels using VR/AR	(Lim et al., 2024b)
Universities	A study assessing the acceptance of AR/VR technology at universities	(Shen et al., 2022)

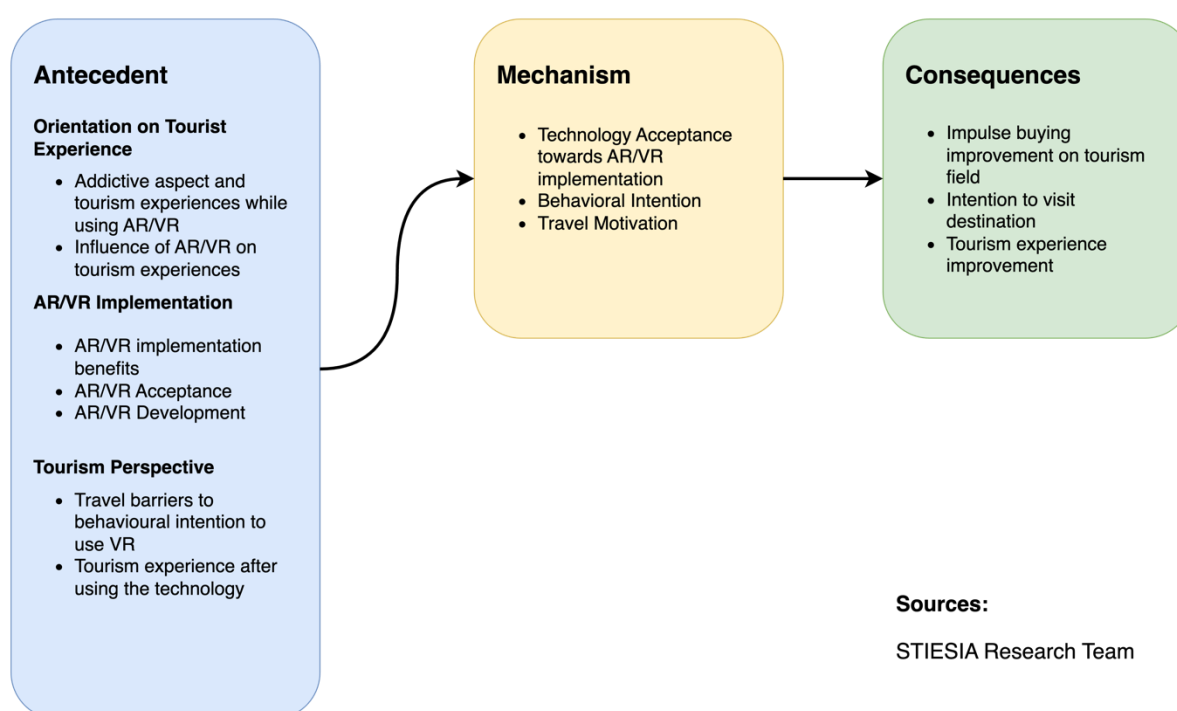


Figure 1. Organizing framework of AR/VR Tourism Marketing

This research tried to discuss the implementation of AR/VR in 3 discussion points. First, what are the current issues in AR/VR development or implementation, especially in the tourism sector? We tried to discuss if there is any phenomenon that should be considered comprehensively. Second, what is the purpose of AR/VR implementation in tourism, especially in tourism marketing? Third, this research wants to expand the literature review by identifying the potential future research in AR/VR implementation in the tourism sector. Is there any potential use of AR/VR for marketing or improving the tourist experience?

What are the Current Issues in Augmented Reality and Virtual Reality?

Nowadays, many tourisms destination use VR as one of ways to attract customers. (Talwar et al., 2022) identify the impact of VR implementation towards customer perception and motivation. The study indicates that the implementation of VR can enhance the customers awareness. This result was also supported by another research indicates that VR implementation can makes customer feels the joyful experience as real experience even though

only through visually from VR headset (McLean et al., 2023). There is another technology can be used to attract customer such as AR. This technology was believed can provides interactive ways to get an information within tourist destination (Anderies et al., 2023). AR can also strengthen customer impulse buying behaviour in tourism destination (Do et al., 2020). The use of technology should be used properly so it can improve the service delivery and number of customer visitation (Sustacha et al., 2023). However, there are any indication that potentially bring the side effects on user.

As mentioned before, Table 2 explains the latest research related to the implementation of AR/VR in tourism experiences. The explanation above is described in several categories, including the main research domain, theory used, method, and object of the research. The explanation related to the domain will be explained in Figure 1. The explanation is described in several categories, namely concepts, mechanisms, and consequences. The theories used in several AR/VR studies will be explained in Figure 2 so that researchers can see the theories that are often used and theories that are rarely used. This makes it easier for future researchers to map research gaps and novelties to conduct further research on the implementation of AR/VR. Theories are divided into three categories, namely device, user, and content. In the device category, it means theories related to the theory of technology adoption in AR/VR. These theories are perceived ease of use, system quality, and technology acceptance model. In the user category, it is a theory related to users in the implementation of AR/VR, namely the theory of perceived enjoyment, innovativeness, usefulness, travel motivation, behavioural intention, and tourist satisfaction. In the content category, it is the immersion theory that is directly related to the implementation of AR/VR.

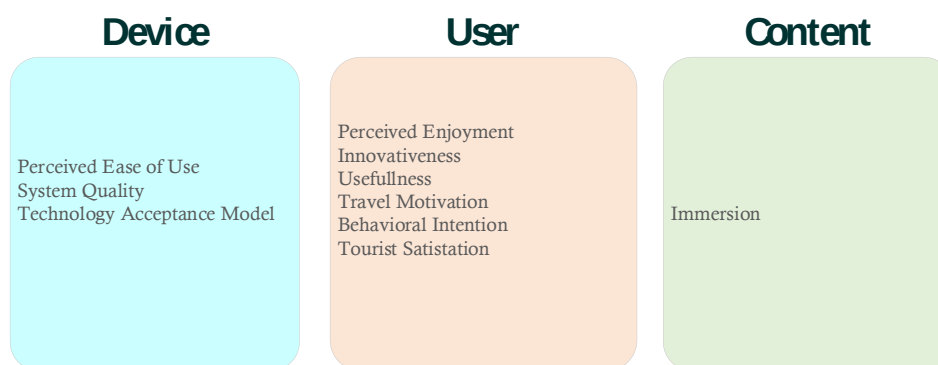


Figure 2. Variables in the AR/VR Research

What is Purposed of AR and VR on Implementation Tourism Marketing?

Augmented reality and virtual reality are some of the technological adoptions developed by combining audio, visuals, and moving images to explain and describe the situation of a particular object. AR/VR is also used by several industrial sectors as their promotional media. Many studies have been developed to assess, analyze, and investigate the influence of AR/VR on their business strategies. In the survey (Merkx & Nawijn, 2021a; Schiopu et al., 2022) it was stated that VR is a new experience for users in seeing their intention of interest in tourism. Hence, this is an important concern for the tourism experience of visitors to a destination. Research (Bretos et al., 2024; Merkx & Nawijn, 2021a) which focuses on the tourism experience is dominated because AR/VR is an addictive tool that can influence them in visiting

a destination. (Çalışkan et al., 2023) explained that using AR/VR in business activities has a positive and addictive impact on their business strategy. Meanwhile, research (Lim et al., 2024) said that user satisfaction is also influenced by the presence of AR/VR technology in all sectors. From the explanation above, it can be said that the purpose of using AR/VR in tourism experiences can influence business strategies, promotional media, and user satisfaction in their tourism experiences or business activities.

Future Research Direction Towards AR and VR on Tourism Marketing

Existing work on AR/VR research toward tourism mainly focuses on technology acceptance, User Experience (UX), and potential side effects (e.g., addiction and isolation while using VR). As mentioned before, we conducted a literature review of 50 articles that focused on AR/VR development or implementation. This review led to several implications and possible research focuses on AR/VR in tourism in the future. First, several tourism owners implement VR to attract customers to visit their tourism destination. VR was developed to generate product knowledge of a restaurant in Italy (Peruzzini et al., 2023). The museum in China develops a VR with holographic in their space. This development (Quan et al., 2024) indicates that it can improve the visitor experience by integrating interior design with VR technology. Despite these benefits, this technology could bring some side effects such as loneliness. VR users could feel lonely from the real world (Oppert et al., 2023). Even though this implementation could result another side effects such as addiction and a temporary sense of isolation, this still positively moderates the tourist experience (Merckx & Nawijn, 2021b).

AR can provide an interesting experience while visiting tourist destinations. For example, it can be used to show historical experiences within the site which was mentioned by previous research (Anderies et al., 2023; Pranoto et al., 2023). Some tourist destination with heritage sites usually cannot be visited due to its fragility object. For example, a cave tourism in China uses an AR to show the panoramic picture of the cave. A museum in Indonesia also implements the same technology that lets the visitor interact with the screen, play games, and present a 3D figure (Suroto et al., 2020). A temple in Thailand also uses this technology to show the visitor about the temple virtually. This preference is a clear indication that AR can become a new tool to promote the destination by enhancing visiting experience.

This literature can lead to possible future research topics on AR/VR such as how AR presence and the experience while using VR can enhance user intention to visit the tourism destination. Based on previous research, VR is often used as a tool to promote and attract people to visit the destination. Meanwhile, AR is often used as a tool to enhance the visiting experience. We find it would be a helpful insight if there is research that integrates the presence and quality of this technology to attract and enhance the visiting experience. Besides that, we need to measure the acceptance of the technology used. This measurement can use the Technology Acceptance Model (TAM) which measures some indicators such as enjoyment, functionality, and ease of usefulness (**Figure 3**).

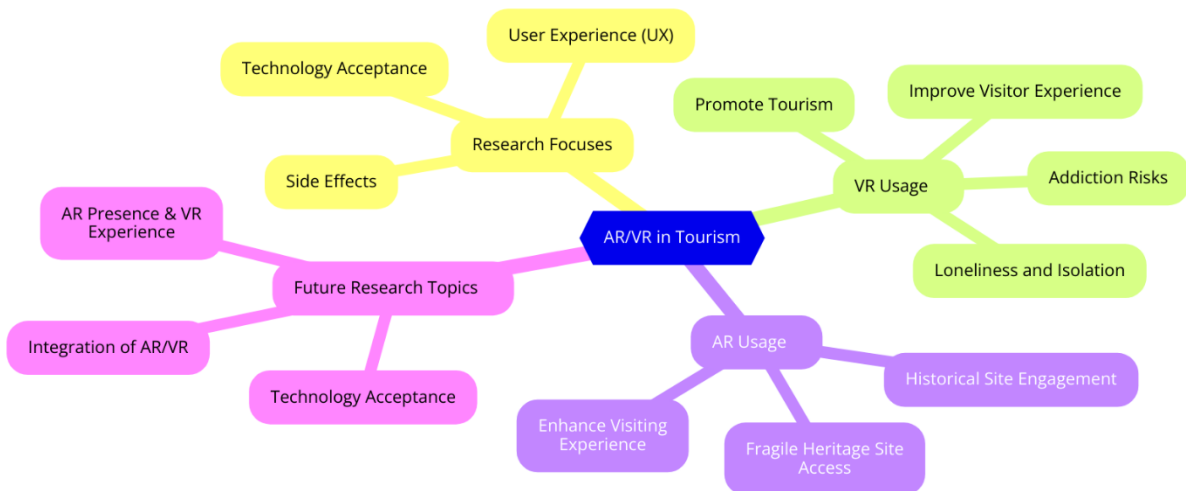
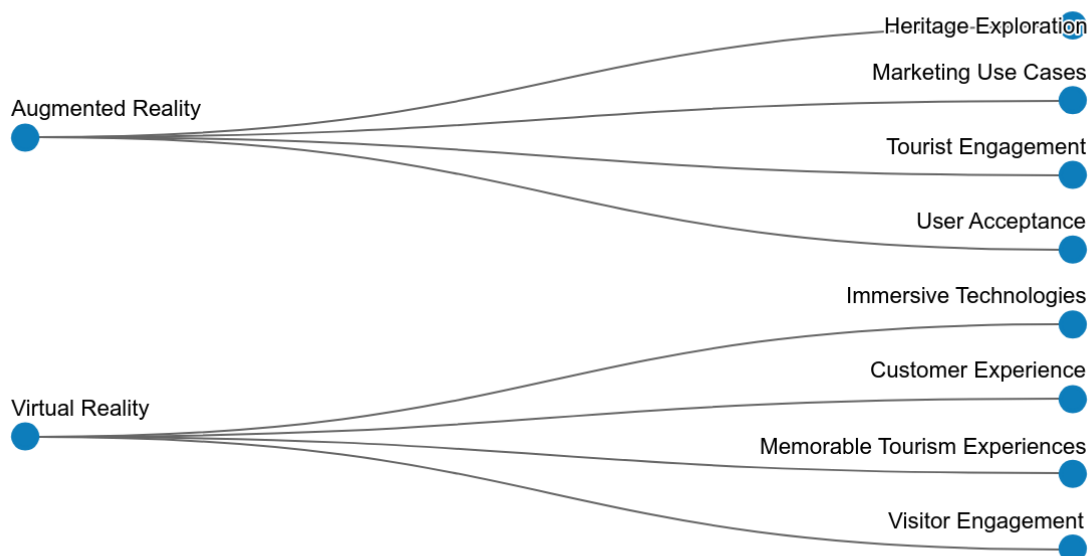


Figure 3. Mind Mapping Future Research. Sources: STIESIA Research Team

In the evolving landscape of tourism, Augmented Reality (AR) and Virtual Reality (VR) are emerging as transformative technologies. These immersive tools have demonstrated their capacity to enhance tourist experiences, engage users, and enrich customer satisfaction across various dimensions (Figure 4).



Powered by Scopus AI, Thu Oct 24 2024

Figure 4. Applications of Augmented Reality (AR) and Virtual Reality (VR) in tourism, showcasing their impact on tourist engagement, customer experience, and immersive technologies. Sources: Scopus AI.

Augmented Reality (AR) is being utilized in Heritage Exploration to provide tourists with enhanced historical and cultural understanding by overlaying digital information on real-world landmarks. This technology is also driving Marketing Use Cases, where brands leverage AR to create interactive advertisements and promotions that increase engagement with potential

visitors. Furthermore, AR's impact on Tourist Engagement is notable, as it offers real-time, location-based services that improve the overall visitor experience. In addition, the User Acceptance of AR solutions is crucial to its success, as higher acceptance rates correlate with more widespread use. AR also contributes to the development of Immersive Technologies, blending digital and physical realities to create a seamless interaction that fosters deeper engagement.

Virtual Reality (VR), on the other hand, plays a significant role in enhancing the Customer Experience. By offering fully immersive digital environments, VR allows potential tourists to explore destinations remotely, thus enhancing their pre-trip decision-making process. VR also contributes to the creation of Memorable Tourism Experiences, providing users with simulations that replicate real-world travel experiences. Additionally, VR is instrumental in improving Visitor Engagement by providing virtual tours of attractions, thereby offering an immersive preview that can influence travel decisions.

Both AR and VR technologies collectively contribute to the enhancement of Tourist Engagement, by offering immersive, user-centered experiences. These technologies enable users to interact with tourism-related content in ways that were previously unimaginable, resulting in deeper engagement and more memorable interactions. This intersection of AR and VR in tourism provides valuable insights into the potential for these technologies to reshape the future of tourism marketing, visitor experiences, and heritage exploration.

5. Conclusions

AR and VR can provide a value proposition for a tourist destination to promote their site. This technology was believed can enhance the visitation experience, attract customers to visit directly, and provide an interesting experience even though the user did not visit directly. With the help of TAM, we can get the level of technology acceptance so we can evaluate its implementation periodically. However, the user experience was believed to have a positive impact on the user's intention to use it again in the future.

Systematic review usually has limitations in its observational and selective process. Somehow, this research still being strict on the keyword to search the articles. It is usually caused by the subjectivity of the researcher while searching the articles related to the topics. Despite these limitations, this study can present the current issue, purpose, and future research within AR/VR that led an insight into how the use of this technology in tourism.

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