Virtual Reality in Festivals: A Systematic Literature Review and Implications for Consumer Research

Daisy Lee [1]*, Peggy M. L. Ng [1], Tai Ming Wut [1]

[1] *School of Professional Education and Executive Development, The Hong Kong Polytechnic University, Kowloon, Hong Kong.*

Abstract

Technological advancements in virtual reality have influenced festivalgoers, performers, and festival organizers. Due to the COVID-19 pandemic, organizers of cultural and tourism festivals have sought to deliver festivals online using virtual reality to provide an immersive experience from home. However, despite growing interest in virtual reality for festivals, there is no current systematic review to synthesize knowledge from academic papers within the festival context. This paper aims to provide a structured understanding of extant virtual reality research regarding festivals by using a systematic literature review. After a comprehensive review of extant literature from major databases, 19 relevant articles were extracted and synthesized according to the types, venues, roles, and objectives of the virtual reality applications. This study is the first systematic literature review to examine the current landscape of consumer research on virtual reality in festivals. Our results show that the limited numbers of extant literature concerning virtual reality in festivals indicates that this is an important yet significantly under-researched topic for future research. Current literature on virtual reality in festival contexts also lacks an in-depth understanding of consumer engagement and experiences. This paper recommends incorporating the application of theory and robust consumer research methods into future virtual festival research.

1- Introduction

Technology advancements have revolutionized how festivalgoers become aware of, consider, attend, enjoy, and share festival experiences. In the last decade, cultural heritages, museums, events, and festivals have been enjoyed at home using affordable gears, mobile phones, or personal computers. This has been done with the development of royalty-free standard technology in virtual reality, including Web3D and 360° videos [1-3]. According to Weiss et al. [4], virtual reality is defined as "the use of interactive simulations created with computer hardware and software to present users with opportunities to engage in environments that appear to be and feel similar to real-world objects and events." Although technologies such as virtual reality have been posited to be indispensable in the arts and culture sector in the 21st century, the adoption of virtual reality in festivals has received relatively little attention to date [5, 6]. The importance of virtual reality only recently entered the minds of festivalgoers and organizers when many important festivals were cancelled for the first time in human history due to the coronavirus pandemic. Many national, regional, and local festivals important to tourism and related communities have been cancelled and replaced by virtual festivals. For example, Burning Man 2020 and 2021 (an annual weeklong arts, culture, music, and community festival held in the Black Rock Desert in northern Nevada) were replaced by a virtual festival [7, 8].

Moreover, Hot Docs 2020 (North America's largest documentary festival) was cancelled, and a virtual market was proposed in its place [9]. Lastly, 20 world-class film festivals, including the Berlin International Film Festival, BFI London Film Festival, Cannes Film Festival, New York Film Festival, Sundance Film Festival, Sydney Film Festival, Tokyo International Film Festival, Toronto International Film Festival, Tribeca Film Festival, and Venice Film Festival,

---

* **CONTACT**: daisy.lee@cpce-polyu.edu.hk

were combined into a 10-day virtual festival [10], while well-known Scottish whisky brands jointly launched the first virtual Lockdown Whisky Festival [11].

Since the beginning of the COVID-19 pandemic, virtual reality has received significant attention in various fields. Examples include using virtual reality to provide medical training and patient care [12], serve as a travel substitution under international travel bans [13, 14], promote mental and physical wellness [15, 16], and enhance education outcomes in online or hybrid teaching [17, 18]. In 2020 and 2021, systematic literature reviews have been conducted on virtual reality applications in many areas, including tourism [19], education [20-22], healthcare [23-25], industry and manufacturing [26, 27], shopping [28], relaxation [29], and business communication [30].

At the same time, the surge of attention to virtual festivals has been observed all over the world and is evidenced by the online search behaviors of global citizens. According to Google Trend, the number of people who conduct online searches using the search term "virtual festival" increased by almost 10 times in early 2020 since the outbreak of COVID-19 as compared with the pre-pandemic period [31]. Australia, Canada, the UK, and the US are among the top search volume regions. While the pandemic has created new trends among festivalgoers, it is important for researchers and practitioners to gain knowledge regarding how to apply virtual reality in festivals to enhance audiences' engagement and experience. However, no available systematic review has been undertaken to synthesize knowledge on virtual reality applications in a festival context. Such rigorous reviews and systematic analyses are needed to examine current application experiences and the roles of virtual reality in festivals as well as clarify research challenges and opportunities to identify future potential research directions. Therefore, this study conducts a systematic review of peer-reviewed journal articles and conference proceedings on virtual reality applications in festivals with the aim of answering the following research questions:

RQ1: What are the objectives and themes of using virtual reality in festivals?

RQ2: Are there differences in the types and roles of virtual reality applied in on-site vs. online festivals?

RQ3: What are the potential research gaps in the adoption of virtual reality in festivals?

The remainder of this systematic review is structured as follows. Section 2 describes three important roles of virtual reality applications and their adoption in tourism and festivals. This section serves to illustrate the use of virtual reality in audience engagement to facilitate readers' understanding of analysis of virtual reality applications in the findings and discussion section (section 4). Section 3 presents this paper's article search strategy following the PRISMA guidelines [32] and highlights the articles identified for the systematic review. Section 4 answers research questions one and two by synthesizing the 19 identified articles regarding the evaluation of research methodology, and roles and applications of virtual reality in festival research. Lastly, section 5 concludes the review and answers research question three by providing insights and implications for future research and practices.

2- Literature Review

2-1- Virtual Reality

There is growing awareness of virtual reality applications throughout the world in various fields. Virtual reality applications have been widely used in tourism, art and museum display, education, health care, manufacturing, marketing, and entertainment [19-30]. Driven by the demand of virtual reality applications, virtual reality tourism and virtual reality festivals continue to represent a growing trend [33]. With the development of virtual reality technologies, people can experience festival events in any place and time by visualizing, manipulating, and interacting with virtual environments. The first virtual reality system was developed by Ivan Sutherland in 1966 for training purposes for the US air force [34]. Since then, virtual reality technology has grown significantly, opening new opportunities for users to experience an immersive environment or scenario.

This paper examines the roles of virtual reality applications and their adoption in festivals. Three important roles of virtual reality applications that have been emphasized in previous research include presence, immersion, and interactivity [35-37]. First, presence refers to the subjective experience of audiences feeling like they are in one place despite being physically situated in another place [38]. Virtual reality is essential for users to 'experience' a visualized space of a dynamic telepresence real world [39]. Presence can influence users' minds to imagine and create positive effects by visualizing spatial environments. For instance, Bruno et al. [40] used a versatile stereoscopic visualization system to create virtual museums that allow users to explore virtual museum halls and unique collections of pieces remotely. Second, immersion in virtual reality represents the users' involvement during consumption, which emphasizes the process of consumption more than the results [41]. Immersion also emphasizes users' perceptions of being enveloped by "an environment that provides a continuous stream of stimuli and experiences" [38]. Chan [42] explained that "immersion in virtual reality involves subjective feelings of embodiment within another realm whilst the objective body is beyond the virtual reality system, in the world at large." In the context of tourism, high immersion of the content affects faster decision or choice making for the consumer. For example, hotels that use virtual reality enable consumers to perceive the hotel surrounding and experience the virtual hotel environment, affecting the consumers' accompanying feelings as well as influencing their purchase intentions [43]. Third, interactivity refers to "the degree to which users of

a medium can influence the form or content of the mediated environment" [44]. Interactivity is one of the key elements for the sense of presence, leading to a type of perception highly similar to that of the real world [37, 44]. To date, there is no study synthesizing evidence on these three important roles (presence, immersion, and interactivity) of virtual reality applications in festivals. This study examines current literatures aiming to understand the objectives in choosing different types of virtual reality and their roles in festivals. The following sub-sections illustrate the types of virtual reality technology currently applied in tourism and festivals.

2-2- Virtual Reality in Tourism

As technology has advanced, the development of virtual reality has greatly impacted the tourism industry. Recently, virtual reality applications have been adopted in many tourism destinations to promote destinations and inspire people to travel more [36]. In Australia, one tourism website (https://www.australia.com) offers immersive 360° footage of the Great Barrier Reef, the Sydney Opera House, and the Harbour Bridge, providing interactive virtual reality experiences to people. In Canada, Niagara Falls Canada introduced interactive virtual reality applications on its website (https://www.niagarafallstourism.com/vr) for users to experience the wonders of Niagara Falls from home.

There is a significant number of recent tourism studies that have explored the effectiveness of virtual reality in improving consumers' virtual travel experiences. For instance, Wang and Tsai [45] conducted two empirical studies (one in Hong Kong with 202 respondents and one in the UK with 724 respondents) to examine the effectiveness of virtual reality as an alternative tourism experience that shapes users' attitudes and behaviors. Their study has confirmed that a sense of presence during virtual reality experiences has positive effects on virtual reality enjoyment and consumer attitude and behavior. Wei et al. [46] have further examined how theme park visitors evaluated their experiences using a sample size of 396 theme park visitors who had tried virtual reality roller coaster over the past twelve months. The authors [46] have empirically demonstrated positive effects of virtual reality experiences on overall theme park satisfaction and intention to revisit and recommend the theme park. These empirical findings show that virtual reality applications allow consumers to create immersive experiences and influence consumers' intentions to visit the destination.

There are three main types of immersive virtual reality experience [47]: fully-immersive, semi-immersive, and non-immersive. The more immersive the virtual reality experience, the less the user perceives the outside world [48]. Equipped with 360° real-life captured content through a virtual reality headset, users can be isolated from the real world and enjoy a fully immersive virtual reality experience [47]. 3D fully immersive virtual reality experience was also found to increase both customer satisfaction and loyalty intention according to a survey of visitors at a Marine Life Center in the west of France [49]. A similar study conducted by Van Kerrebroeck et al. [50] has shown that a fully immersive system in a shopping mall positively affected customer satisfaction and loyalty in a virtual reality experience.

In a semi-immersive virtual reality environment, user experiences are visualized through a large screen monitor or projection screens with 3D sound. The design of a semi-immersive virtual reality system is based on passive 3D technology; thus, users still have some contact with the real world [51]. Semi-immersive virtual reality systems have been widely used in the contexts of entertainment, education, marketing, heritage preservation, and training and development [52, 53].

Lastly, non-immersive virtual reality refers to a visualization delivered two-dimensionally by a computer monitor [47]. This kind of virtual reality experience is the simplest and easiest; people can interact with the virtual environment or sites using a mouse, keyboard, or other external devices. Huang et al. [54] have identified that perceived ease of use, perceived usefulness, enjoyment, flow, and emotional involvement affect tourists' experience and behavioral intentions using a non-immersive virtual reality system (Second Life) within a tourism destination. Similarly, Wan et al. [55] have examined the advertising effects of using brochures and virtual experiences (e.g., a non-immersive, web-based virtual tour), and their results show that non-immersive virtual reality experiences lead to stronger advertising effects. Furthermore, their empirical findings also demonstrate that virtual reality experiences have a significant impact on the tourism industry [55].

2-3- Virtual Reality in Festivals in the Digital Age

Festivals are a key component of the tourism product. Festivals play a major role in the development of tourism, strengthening the cultural development of host regions and cities [56]. As virtual reality devices become more popular, users can easily access virtual festivals. Virtual reality festivals have been touted as a substitute to actual festival travel. International film festivals are some of the world's largest festival events, and virtual reality artworks have been showcased in various film festivals. With the integration of virtual reality artworks in international film festivals, such as Virtual Arcade at the Tribeca Film Festival and virtual reality artworks in the Cannes Film Festival [57], these changes provide a strong opportunity for users to experience the virtual walkthroughs of festivals as if they are part of them. With the development of virtual reality in festivals, increasing users can experience the virtual environments of festivals and cultural events, and destination images and brands can be embraced [58]. In addition, using virtual reality in festivals can attract numerous visitors to learn more about festivals and the festive culture of the host cities or regions. Visitors may then make the decision to travel and visit the actual festivals, enhancing the local economic development of the

cities [6]. Despite growing interest in and discussions on virtual reality overall and in tourism contexts, no in-depth review nor analysis of research on virtual reality in festivals has yet to be completed. Thus, this study seeks to bridge this research gap by providing a systematic quantitative review of existing literature concerning virtual reality in festivals.

3- Methodology

This paper adopts a systematic quantitative review approach to synthesize and analyze extant literature on the topic of virtual reality in festivals and identify priorities for future research. A systematic, quantitative literature review identifies what has been uncovered within this research topic and thus what knowledge gaps exist regarding virtual reality in festivals for academics and practitioners [59, 60]. This method is particularly suitable for an emerging area of research because a relative scarcity of research limits one's potential to adopt other popular methodological approaches such as meta-analysis [61, 62]. This paper uses the systemic quantitative approach to map the boundaries of current research and identify trends and patterns for exploration of potential future research ideas in virtual reality applications in festivals.

The review process began with the formulation of the research aims and questions presented in the introduction. The authors then defined a review protocol, following the PRISMA guidelines [32], that includes the selection of databases, search terms, and literature screening criteria. This first involved the use of large and popular databases commonly used in tourism as well as arts and humanities, including EBSCO, Google Scholar, ProQuest, Science Direct, Scopus, and Web of Science, to search for relevant literature and conference proceedings [63, 64]. Second, to capture extant research that has investigated virtual reality applications in festivals, the authors used the search terms "virtual," "virtual reality," "VR," "virtual environment," AND "festival" for title, keyword, and abstract searches. Third, search outcomes were screened against inclusion and exclusion criteria. The inclusion criteria centered on the following: (1) publication genre, as only peer-reviewed journal articles and conference proceedings published in English were considered; (2) time, as the search was not limited to any specific time period to allow for a comprehensive review of the emerging area of virtual reality in festival; and (3) formal criteria , as only studies that describe the application of virtual reality in festivals that aim to enhance the experiences of festivalgoers were included. In terms of exclusion criteria, papers that were not available in full text or focused on technical specifications and technologies of virtual reality were excluded.

The initial search produced 95 articles, with eight from EBSCO, 22 from Google scholar, nine from ProQuest, four from Science Direct, 40 from Scopus, and 12 from Web of Science. After the removal of duplications, 72 articles were left. These remaining 72 articles were analyzed in full and screened for inclusion and exclusion criteria. A total of 54 articles were excluded from the final synthesis. Five articles were excluded because they published similar results for the same study. Four additional articles were excluded because they focused on specifications of virtual reality technologies. Lastly, 45 articles were excluded because these papers were unrelated to virtual reality applications in festivals. After this stage, one additional article relevant to the research topic was identified through reference lists. Finally, with the removal of duplicates and articles that did not meet the inclusion criteria, 19 articles in total were included for analysis. The systematic review process is summarized in Figure 1.
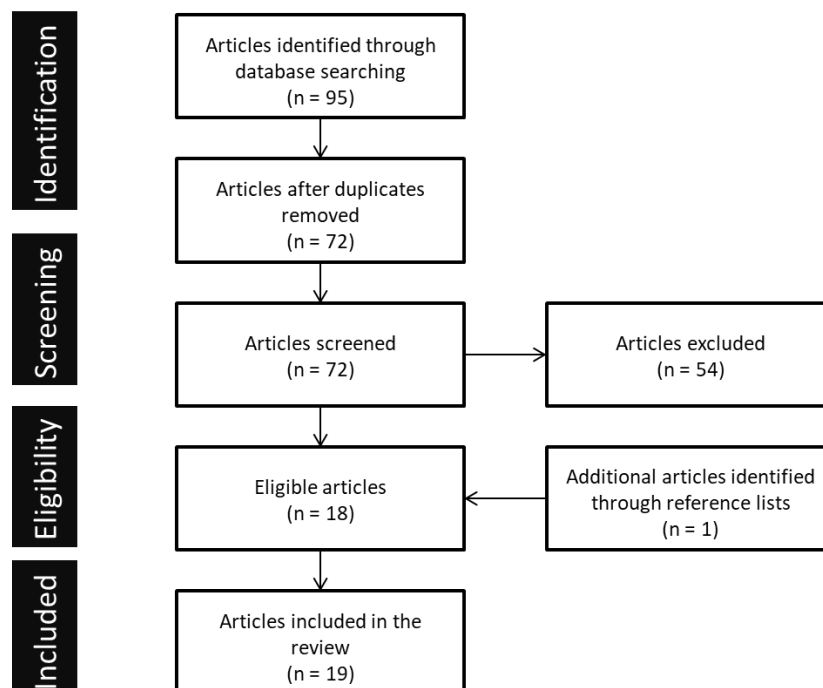

Figure 1. Summary of systematic review process

4- Findings and Discussion

The 19 chosen articles were fully examined and synthesized by the researchers. Table 1 summarizes the articles on virtual reality in festivals. Among these articles, 15 (79%) were published in the last 10 years, and 3 (16%) were published in last year. This indicates that virtual reality is receiving increasing attention in festival research. The chosen studies were conducted all over the world, including four studies in Asia (21%), four in Australia (21%), two in Canada (11%), and seven in Europe (37%). In addition to covering real festivals, two papers (10%) also documented online festivals. Pan et al. [65], for instance, document the virtual reproduction of a traditional festival portrayed on an ancient painting. Armstrong [66] reports on how the film festivals of 2020 that were cancelled due to COVID-19 (either the entire festival circuit, events, screenings, or conferences) were brought to global audiences by using virtual reality and other technologies.

Table 1. Summary of articles used in the literature review

Author (Year)	Title	Festival	Place of festival
Journal Articles			
Armstrong (2021)	Virtual Visibility and the Film Festival Circuit	We Are One: Global Film Festival	online
Dieck et al. (2021)	Exploring Usability and Gratifications for Virtual Reality Applications at Festivals	European City of Science festivities	Manchester, UK
Kersting et al. (2021)	Exploring participant engagement during an astrophysics virtual reality experience at a science festival	Science Alive!	Geelong, Australia
Evans (2019)	"The Name Is Sherlock Holmes, and the Address Is 221B Baker Street": Virtual Reality, Fan Communities, and Tourism	Festival of Great Britain	London, UK
Dooley (2019)	Real and unreal things: virtual reality at the 2018 Adelaide Film Festival	Adelaide Film Festival	Adelaide, Australia
Klimek (2018)	From programmer to curator: How film festivals are pushing the boundaries of new media and expanded cinema	Hot Docs Canadian International Film Festival and imagineNATIVE Film + Media Arts Festival	Toronto, Canada
Baker (2017)	A Tradition of Evolution: The Vancouver Indigenous Media Arts Festival	Vancouver Indigenous Media Arts Festival	Vancouver, Canada
Nichols (2016)	IDFA: A Festival of Attractions	The International Documentary Film Festival (IDFA)	Amsterdam, Netherlands
Stevens (2016)	Virtual futures and cinematic pasts at the 65th Melbourne International Film Festival	Melbourne International Film Festival	Melbourne, Australia
Robertson et al. (2015)	Technology, society, and visioning the future of music festivals	Music festivals	not specified
Li et al. (2014)	Virtual Yamahoko parade experience system with vibration simulation	Yamahoko Parade in the Gion Festival	Kyoto, Japan
Robertson and Yeoman (2014)	Signals and signposts of the future: Literary festival consumption in 2050	Literary festivals	Shanghai, China; and Melbourne, Australia
Kwiatek (2012)	How to preserve inspirational environments that once surrounded a poet? Immersive 360° video and the cultural memory of Charles Causley's poetry	The Charles Causley Festival	Launceston, UK
Klein (2011)	Breathing, Lying, Sitting, Standing, and Walking: Finland's ANTI Festival	ANTI Festival	Kuopio, Finland
Conference Proceedings			
Wang and Tsai (2019)	Application of Virtual Reality to the Study of Festival Culture in Aboriginal Literature	Aboriginal festivals	Taiwan
Syu et al. (2018)	A case study of digital preservation of motion capture for Bā Jiā Jiāng performance, Taiwan religious performing arts	Taiwan Bā Jiā Jiāng Festival Parade	Yunlin, Taiwan
Gibb et al. (2017)	Edinburgh festival explorer demo	Edinburgh Festival	Edinburgh, Scotland
Pan et al. (2007)	Virtual presentation and animation of Qingming Festival by the riverside	Qingming Festival (on an ancient painting)	Bianliang city, (ancient China)
Polovina et al. (2000)	Culture and Web3D: Experiences in Building a Virtual Beer Festival Site in 3DML	St. Albans Beer & Cider Festival	St Albans, UK

Table 2 outlines the themes and types of festivals studied in the articles. The most studied type has been arts and literature (32%), followed by film (16%). Almost 50% of the articles included for review focus on arts and film festivals because using virtual reality for the presentation of arts and film is usually already part of the festival programs [67-73]. Thus, festival organizers, producers, performers, and delegates are most likely technologically savvy in integrating virtual reality into the festival. Moreover, a vast majority of studies are case studies that document how art and films can be variously presented using virtual reality in festivals.

Table 2. Themes and types of festival studied in the articles

Themes	%	Types of festivals	No. of studies
Arts and Literature	32%	Arts Festival	1
		Contemporary Art Festival	1
		Festival of Arts And Literature	1
		Literary Festival	1
		Media Arts Festival	2
Cultural	11%	Aboriginal Festival	1
		National Celebration	1
Food and beverages	5%	Beer Festival	1
Film	16%	Film Festival	3
Music	5%	Music Festival	1
Science and technology	11%	Science Festival	2
Religious	11%	Religious Festival	2
Others	11%	Virtual Festival	2
Total	**100%**		**19**

According to Table 3, 13 of the 19 articles (68%) used the case study method, while two articles (11%) were conceptual in nature. Three articles (16%) used on-site experiments to examine the effectiveness of virtual reality by creating situational comprehension and reproducing the overall atmosphere of the festivals. Only one study (5%) adopted a theoretical framework using the uses and gratification theory and technology acceptance model to quantitatively assess consumers' intention to use virtual reality in festivals [74]. Most of the extant literature has simply documented or reported how virtual reality has been used in live festivals. These studies did not evaluate audiences' engagement and experience to inform future applications of virtual reality in festivals. As many 2020 festivals around the globe were either cancelled or moved online, it would be important to understand how to apply virtual reality in festivals to effective enhance audience experiment. The results of this systematic review indicate that academic research investigating how virtual reality can bring immersive festival experiences to audiences is significantly lacking. Factors that influence of online festival choice, audience engagement, and experiences related to the application of virtual reality in festivals (either online, hybrid, or offline) have yet to be examined.

Table 3. Research methodology used in the articles

Methodology	No. of studies	%
Case study/conceptual paper	13	68%
Conceptual paper	2	11%
Cross-sectional survey	1	5%
Field experiment	3	16%
Total	19	100%

Table 4 summarizes the types of virtual reality technology used in the studies. Most studies (7 out of 19 studies) used head-mounted display (HMD) goggles such as Oculus Rift, Oculus, Go, HTC Vive, and Samsung Gear together with a festival mobile application (downloaded from the Apple App Store or Google Play) [67-71, 73, 75]. Other virtual reality technologies include immersive 3D display technologies such as 360° videos (5 studies) and Web3D (1 study) to provide audiences with remote access to festivals using mobile phones or computer web browsers [65, 74, 76-79]. The choice of virtual reality technology has been found to be linked closely with the venue of virtual reality applications. Festivals often use head-mounted display gears that are usually intended to provide attendees with on-site virtual reality experiences at the festival. Both interactive and non-interactive immersive technologies including 360° videos and Web3D have been used to provided virtual reality experiences to audiences or potential festivalgoers either online or at a location other than the festival site. Hence, the choice of virtual reality technology was also associated with the experience to be brought to the audiences. Regarding technology type, the results of the current study indicate that extant literature has only reported on the use of various virtual reality technologies and has not examined the associated consumer experience to provide recommendations for future virtual reality applications in festivals.

Table 4. Types of virtual reality technology used in the articles

Type of VR technology used	No. of studies	%
Head-mounted display (HMD) goggles (e.g., Oculus, HTC Vive)	7	37%
Not mentioned	6	32%
Immersive video (e.g., 360° videos)	5	26%
Web3D	1	5%
Total	19	100%

Table 5 summarizes the venues and roles of virtual reality applications in each festival featured in the chosen articles. These include on-site (used at the festival), online (accessed using common devices such as mobile phones or personal computers), and off-site (used at a location other than the festival site and not during the festival period) venues. The roles of virtual reality applications include festival experiences characterized as presence (feel like being in the festival), immersion (continuous experiences of the festival), and interactivity (interactions among festival attendees, performers, and producers). According to the summary in Table 5, virtual reality was used for interactivity only on-site at the festival. None of the studies used virtual reality for interactivity in online or off-site environments. When virtual reality was used on-site, all studies used it for immersion to envelop festival attendees with continuous stimulation and experiences. When virtual reality was used to deliver the festival online or off-site, the major roles of virtual reality in almost all studies focused on making the festival virtually accessible (presence) and enabling audiences to experience the festival (immersion) even though they are not physically attending it. Regarding venues and virtual reality applications, the results indicate that interactive elements have not been introduced for virtual festivals to drive audience engagement and enhance audience experience. Thus, research that explores the interactive elements that are treasured by consumers and can be delivered through virtual reality in online festivals can offer valuable contributions to future research.

Table 5. Venues and roles of VR applications

Venue of VR application	Festival	Role of VR		
		Presence	Immersion	Interactivity
On-site		**0%**	**100%**	**36%**
	Adelaide Film Festival		1	
	ANTI Festival		1	
	European City of Science festivities		1	
	Festival of Great Britain		1	
	Hot Docs Canadian International Film Festival and imagineNATIVE Film + Media Arts Festival		1	1
	Literary festivals		1	1
	Melbourne International Film Festival		1	
	Music festivals		1	1
	Science Alive!		1	1
	The International Documentary Film Festival (IDFA)		1	
	Vancouver Indigenous Media Arts Festival		1	
Online		**100%**	**100%**	**0%**
	Edinburgh Festival	1	1	
	Festival of Great Britain	1	1	
	Global Film Festival	1	1	
	St Albans Beer & Cider Festival	1	1	
	Taiwan Bā Jiā Jiāng Festival Parade	1	1	
	The Charles Causley Festival	1	1	
Off-site		**100%**	**100%**	**0%**
Classroom	Aboriginal festivals	1	1	
Promotion venue	Edinburgh Festival	1	1	
Promotion venue	Hot Docs Canadian International Film Festival and imagineNATIVE Film + Media Arts Festival	1	1	
Exhibition site	Qingming Festival	1	1	
Experiment site	The Charles Causley Festival	1	1	
Lab	Yamahoko Parade in the Gion Festival	1	1	

Lastly, this review examines the articles regarding the objectives for using virtual reality in festivals. Table 6 summarizes the venues and objectives of virtual reality applications in each festival featured in the articles. The objectives of virtual reality applications identified from the articles are classified into five types: (i) cultural education, where virtual reality is used to aid cultural education in relation to the festival [69, 80]; (ii) festival promotion, where virtual reality is used as a promotional tool to attract festivalgoers to attend the festivals [68, 73, 77, 79, 81]; and (iii) preservation of intangible cultural heritage, where virtual reality is used to preserve intangible cultural heritage associated or delivered through the festivals [65, 76-78]; (iv) virtual reality as part of the festival programs, where some of the festival programs or activities are delivered using virtual reality [67, 68, 70-72, 74, 75, 81]; and (v) co-creation of festival experience, where virtual reality is used to facilitate interactions among festival attendees, performers, and producers [66, 82, 83]. Comparing the studies conducted before and during COVID-19, prior to the pandemic, virtual reality mainly served as a promotional tool for consumers to experience the festival before making a purchase or as part of the festival program to enhance consumers' enjoyment of the on-site festival. In the post-pandemic era of online festivals, the objectives of virtual reality applications in festivals will likely have to be expanded or redefined.

Table 6. Objectives of VR applications

Venue of VR applications	Festival	Objectives of VR applications				
		Cultural education	Festival / tourism promotion	Preservation of intangible cultural heritage	VR as part of the festival program	co-creation of festival experience
On-site		**9%**	**0%**	**9%**	**73%**	**27%**
	Adelaide Film Festival				1	
	ANTI Festival				1	
	European City of Science festivities				1	
	Festival of Great Britain				1	
	Hot Docs Canadian International Film Festival and imagineNATIVE Film + Media Arts Festival				1	
	Literary festivals					1
	Melbourne International Film Festival				1	
	Music festivals					1
	Science Alive!				1	1
	The International Documentary Film Festival (IDFA)			1	1	
	Vancouver Indigenous Media Arts Festival	1				
Online		**0%**	**50%**	**33%**	**0%**	**17%**
	Edinburgh Festival		1			
	Festival of Great Britain		1			
	Global Film Festival					1
	St Albans Beer & Cider Festival		1			
	Taiwan Bā Jiā Jiāng festival parade			1		
	The Charles Causley Festival			1		
Off-site		**17%**	**50%**	**50%**	**0%**	**0%**
Classroom	Aboriginal festivals	1				
Promotion venue	Edinburgh Festival		1			
Promotion venue	Hot Docs Canadian International Film Festival and imagineNATIVE Film + Media Arts Festival		1			
Exhibition site	Qingming Festival			1		
Experiment site	The Charles Causley Festival			1		
Lab	Yamahoko Parade in the Gion Festival	1		1		

According to the summarized results in Table 6, festivals used virtual reality on-site mainly because the delivery of festival activities through virtual reality was an official part of the programs. For festivals using virtual reality online or off-site, half of the articles demonstrate how virtual reality was deployed as a promotional tool to entice festival attendance, while the other half of the articles highlight how the technology was used for the preservation of intangible

cultural heritage. The Armstrong [66] paper is the first article to document the use of virtual reality in online festivals that went fully online due to lockdowns and the pandemic. Thus, the results show an interesting point, which is that the pandemic changes the roles and objectives of virtual reality applications from an augmented part to an essential part of festivals, providing potential future research ideas in post-pandemic festival studies.

5- Conclusion

The current literature on virtual reality applications in festival contexts has not yet provided an in-depth review of this topic. This study, to the best of the authors' knowledge, is the first systematic literature review to examine the current landscape of research on virtual reality in festivals. Through a systematic quantitative review of 19 articles, this paper synthesized the articles according to types, venues, roles, and objectives of virtual reality applications. Although technology advancements and the availability of free open standards have made the provision of virtual festivals feasible and manageable, little academic attention has been placed on virtual reality applications in festival research. Moreover, the clear omission of a theoretical framework in the research design of extant virtual festival studies has limited authors' abilities to explain the contributing factors of audience behavior, engagement, and experience. This systematic review contributes to the knowledge of virtual reality applications in the context of festival research by synthesizing what has been identified in extant literature and recommending potential areas for future research in section 5.1. Furthermore, recommendations for practitioners regarding promoting stronger festival experiences both on-site and online are discussed in section 5.2.

This review contains several inevitable limitations. Usages of virtual reality in festivals reported in industry and government documents are excluded from this paper, which instead only includes peer-reviewed academic articles. The 19 studies included in this review were also all conducted in developed countries, mostly in Europe. The weaknesses and challenges of virtual reality, especially in developing countries, have not been discussed in these works. However, as technologies such as virtual reality are crucial to tourism in developing countries and rural tourism recovery after COVID-19 [84], future studies should further explore the weaknesses and challenges of virtual reality in festivals for both developed and developing countries.

5-1- Implications for Future Research

With the latest technological advancements and the recent coronavirus pandemic, virtual reality is highly likely to be a major part of the festival landscape. Nevertheless, the limited numbers of extant literature concerning virtual reality in festival research indicates that this is an important yet significantly under-researched topic. Continued research on virtual reality applications in festivals is crucial for addressing the relatively limited body of knowledge on this topic. While most existing festival research related to virtual reality applications has taken a case study approach, the scope and scale of knowledge regarding festivals can be widened through conceptual and theoretical research. Established, validated models in tourism research related to virtual reality applications, such as the technology acceptance [54] and telepresence models [85], should be used to examine the effectiveness of virtual reality initiatives rather than simply record how virtual reality is applied in festivals. The application or development of theories within the festival context is strongly needed. Increased robust usage of qualitative, quantitative, and mixed research methods to examine consumers' acceptance, experiences, and behavior intentions regarding festivals that use virtual reality applications can offer valuable contributions to virtual festival research. From the perspectives of consumer engagement and the enhancement of audience experiences, potential areas for future research might include the following: (1) the suitability of types of virtual reality technology for various types of festivals; (2) the suitability of types of virtual reality technology for festivalgoers from different cultures; (3) the effectiveness of virtual reality applications in promoting presence, immersion, and interactivity; (4) the acceptance of virtual reality applications in festivals from the perspectives of attendees, performers, and organizers; and (5) the effectiveness, opportunities, and challenges of using virtual reality in festivals for cultural education, festival marketing and promotion; the preservation of intangible cultural heritage; the enrichment of the festival programs, and the co-creation of festival experiences. Further sophisticated methods, both qualitative and quantitative, in research on virtual reality applications in festivals can contribute to advanced theoretical and practical knowledge of festivals.

5-2- Managerial Implications

During and after the pandemic, virtual reality has become an important medium for the creation of new festival experiences. The festival experience can be provided in any place and time with no limitations on whether festivalgoers can attend in person or at the time when the festival is convened. However, to deliver a pleasant virtual festival experience, the authors recommend that the types of virtual reality experiences to be delivered in terms of presence, immersion, and interactivity should be determined according to the objectives of applications. The venue of virtual reality applications and the choice of technologies play detrimental and beneficial roles in the provision of a genuine experience to audiences. Thus, virtual reality gear is usually provided when the experience is on-site at the festival. Otherwise, easy-to-use and affordable methods such as Web3D or 360° videos are adopted to reduce audience effort

when accessing and immersing themselves in the virtual festival. In the reviewed articles, effective off-site virtual reality experiences were set up at the ticket offices of the real festivals. The authors also recommend that when virtual reality is used for the marketing and promotion of a festival, the virtual festivals or teasers should be arranged next to ticket purchase facilities.

The authors also recommend festival organizers with small budgets or resources to consider using virtual reality to enrich the audience experience. Prior to the availability of 360° videos in 2015 [2, 3], virtual reality in festivals required heavy technology and budget investments. However, the production of 360° videos has even allowed tourists to take and post their travel videos on social media. Many handy guides are also available online to make the production of virtual festivals less technically challenging, particularly for local festivals operating with small resources [86]. Additionally, Google Arts and Culture has gained extensive exposure because people are actively seeking home alternatives for events, museums, travel, and festivals during the coronavirus pandemic. Partnering with cultural institutions and artists around the world, Google Arts and Culture (https://artsandculture.google.com) aims "to preserve and bring the world's art and culture online so it's accessible to anyone, anywhere." In the past, one of the challenges for festivals going "virtual" was having the resources and knowledge to advertise the virtual festival. Now, the provision of virtual festivals through Google Arts and Culture enables festivals to reach a wide audience in an efficient and effective manner.

6- Declarations

6-1- Author Contributions

Conceptualization, D.L., P.N. and E.W.; methodology, D.L.; validation, D.L., P.N. and E.W.; formal analysis, D.L.; data curation, D.L.; writing—original draft preparation, D.L. and P.N.; writing—review and editing, D.L.; visualization, D.L.; supervision, D.L.; project administration, D.L. All authors have read and agreed to the published version of the manuscript.

6-2- Data Availability Statement

Data sharing is not applicable to this article.

6-3- Funding

6-4- Institutional Review Board Statement

Not applicable.

6-5- Informed Consent Statement

Not applicable.

6-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

7- References

[1] Cover, Robin. (2001). X3D Open Web3D Standard Now Available: Adoption by MPEG-4 Group, Cooperation With World Wide Web Consortium, and Open Source Implementation to Propel Commercial Adoption of Royalty-Free Standard. The XML Cover Pages. Available online: http://xml.coverpages.org/Extensible3D-RoyaltyFree200202.html (accessed on May 2022).

[2] Garza, F. (2015). With Google's new immersive videos, you can feel what it's like to be a ballet dancer. Quartz. Available online: http://qz.com/562697/with-googles-new-immersive-videos-you-can-feel-what-its-like-to-be-a-ballet-dancer/ (accessed on June 2022).

[3] Etherington, D. (2015). Facebook to Support Spherical Video In News Feed And Oculus. TechCrunch. Available online: https://techcrunch.com/2015/03/25/facebook-to-support-spherical-video-in-news-feed-and-oculus/ (accessed on May 2022).

[4] Weiss, P. L., Rand, D., Katz, N., & Kizony, R. (2004). Video capture virtual reality as a flexible and effective rehabilitation tool. Journal of NeuroEngineering and Rehabilitation, 1(1), 1-12. doi:10.1186/1743-0003-1-12.

[5] Sitthimongkolchai, N., Viriyavejakul, C., & Tuntiwongwanich, S. (2022). The BEE Model with Live Virtual Classroom to Enhancing Creative Works. Emerging Science Journal, 6, 108-122. doi:10.28991/ESJ-2022-SIED-08.

[6] Mair, J., & Weber, K. (2019). Event and festival research: a review and research directions. International Journal of Event and Festival Management, 10(3), 209–216. doi:10.1108/IJEFM-10-2019-080.

[7] Ochoa, J. (2020). Burning Man 2020 Canceled Due To Coronavirus Pandemic, Announces Virtual Festival. In The Recording Academy - GRAMMY Awards. Available online: https://www.grammy.com/grammys/news/burning-man-2020-canceled-due-coronavirus-pandemic-announces-virtual-festival (accessed on June 2022).

[8] Dapoigny, M. (2021).Festivals Going Virtual: New Realms and Hurdles of VR and Digital Events. We Are Europe. Available online: https://weare-europe.eu/festivals-going-virtual-new-realms-and-hurdles-of-vr-and-digital-events/ (accessed on February 2022).

[9] Kay, J. (2020).Hot Docs postpones festival amid coronavirus pandemic, plans virtual market. Screen Daily. Available online: https://www.screendaily.com/news/hot-docs-postpones-festival-amid-coronavirus-pandemic-plans-virtual-market/5148128.article (accessed on May 2022).

[10] Clarke, C. (2020). You can attend this year's Cannes, Sundance and Tribeca film festivals from your couch. CBS News. Available. Available online: https://www.cbsnews.com/news/cannes-sundance-tribeca-film-festivals-online-youtube/ (accessed on May 2022).

[11] Smith, K. (2020). World's first lockdown whisky festival announced. Scottish Field. Available. Available online: https://www.scottishfield.co.uk/food-and-drink-2/whisky/worlds-first-lockdown-whisky-festival-announced/ (accessed on May 2022).

[12] Singh, R. P., Javaid, M., Kataria, R., Tyagi, M., Haleem, A., & Suman, R. (2020). Significant applications of virtual reality for COVID-19 pandemic. Diabetes and Metabolic Syndrome: Clinical Research & Reviews, 14(4), 661–664. doi:10.1016/j.dsx.2020.05.011.

[13] Sarkady, D., Neuburger, L., & Egger, R. (2021). Virtual Reality as a Travel Substitution Tool during COVID-19. Information and Communication Technologies in Tourism, 452–463. Springer, Cham, Switzerland. doi:10.1007/978-3-030-65785-7_44.

[14] Schiopu, A. F., Hornoiu, R. I., Padurean, M. A., & Nica, A. M. (2021). Virus tinged? Exploring the facets of virtual reality use in tourism as a result of the COVID-19 pandemic. Telematics and Informatics, 60, 101575. doi:10.1016/j.tele.2021.101575.

[15] Siani, A., & Marley, S. A. (2021). Impact of the recreational use of virtual reality on physical and mental wellbeing during the Covid-19 lockdown. Health and Technology, 11(2), 425–435. doi:10.1007/s12553-021-00528-8.

[16] Gao, Z., Lee, J. E., McDonough, D. J., & Albers, C. (2020). Virtual Reality Exercise as a Coping Strategy for Health and Wellness Promotion in Older Adults during the COVID-19 Pandemic. Journal of Clinical Medicine, 9(6), 1986. doi:10.3390/jcm9061986.

[17] Iwanaga, J., Loukas, M., Dumont, A. S., & Tubbs, R. S. (2021). A review of anatomy education during and after the COVID-19 pandemic: Revisiting traditional and modern methods to achieve future innovation. Clinical Anatomy, 34(1), 108–114. doi:10.1002/ca.23655.

[18] Azar, A. S., & Tan, N. H. I. (2020). The application of ICT techs (mobile-assisted language learning, gamification, and virtual reality) in teaching English for secondary school students in Malaysia during covid-19 pandemic. Universal Journal of Educational Research, 8(11C), 55-63. doi:10.13189/ujer.2020.082307.

[19] Jingen Liang, L., & Elliot, S. (2021). A systematic review of augmented reality tourism research: What is now and what is next? Tourism and Hospitality Research, 21(1), 15–30. doi:10.1177/1467358420941913.

[20] Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. Computers & Education, 147, 103778. doi:10.1016/j.compedu.2019.103778.

[21] Hamilton, D., McKechnie, J., Edgerton, E., & Wilson, C. (2021). Immersive virtual reality as a pedagogical tool in education: a systematic literature review of quantitative learning outcomes and experimental design. Journal of Computers in Education, 8(1), 1–32. doi:10.1007/s40692-020-00169-2.

[22] Parmaxi, A. (2020). Virtual reality in language learning: a systematic review and implications for research and practice. Interactive Learning Environments, 1–13. doi:10.1080/10494820.2020.1765392.

[23] Cieślik, B., Mazurek, J., Rutkowski, S., Kiper, P., Turolla, A., & Szczepańska-Gieracha, J. (2020). Virtual reality in psychiatric disorders: A systematic review of reviews. Complementary Therapies in Medicine, 52, 102480. doi:10.1016/j.ctim.2020.102480.

[24] Dermody, G., Whitehead, L., Wilson, G., & Glass, C. (2020). The role of virtual reality in improving health outcomes for community-dwelling older adults: Systematic review. Journal of Medical Internet Research, 22(6), 17331. doi:10.2196/17331.

[25] Smith, V., Warty, R. R., Sursas, J. A., Payne, O., Nair, A., Krishnan, S., da Silva Costa, F., Wallace, E. M., & Vollenhoven, B. (2020). The Effectiveness of Virtual Reality in Managing Acute Pain and Anxiety for Medical Inpatients: Systematic Review. Journal of Medical Internet Research, 22(11), 17980. doi:10.2196/17980.

[26] Guo, Z., Zhou, D., Zhou, Q., Zhang, X., Geng, J., Zeng, S., Lv, C., & Hao, A. (2020). Applications of virtual reality in maintenance during the industrial product lifecycle: A systematic review. Journal of Manufacturing Systems, 56, 525–538. doi:10.1016/j.jmsy.2020.07.007.

[27] Zhang, Y., Liu, H., Kang, S. C., & Al-Hussein, M. (2020). Virtual reality applications for the built environment: Research trends and opportunities. Automation in Construction, 118, 103311. doi:10.1016/j.autcon.2020.103311.

[28] Xi, N., & Hamari, J. (2021). Shopping in virtual reality: A literature review and future agenda. Journal of Business Research, 134, 37–58. doi:10.1016/j.jbusres.2021.04.075.

[29] Riches, S., Azevedo, L., Bird, L., Pisani, S., & Valmaggia, L. (2021). Virtual reality relaxation for the general population: a systematic review. Social Psychiatry and Psychiatric Epidemiology, 56(10), 1707–1727. doi:10.1007/s00127-021-02110-z.

[30] Wen, J., & Gheisari, M. (2020). Using virtual reality to facilitate communication in the AEC domain: a systematic review. Construction Innovation, 20(3), 509–542. doi:10.1108/CI-11-2019-0122.

[31] GoogleTrend. Interest over time (past 5 years). Available online: https://trends.google.com/trends/explore?q=virtual%20festival (accessed on June 2022).

[32] Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gotzsche, P. C., Ioannidis, J. P. A., … Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. BMJ, 339(jul21 1), b2700–b2700. doi:10.1136/bmj.b2700.

[33] Moutinho, L., Ballantyne, R., & Rate, S. (2011). Futurecast applied to tourism. Strategic management in tourism, 20-32, Wallingford, United Kingdom. doi:10.1079/9781845935887.0020.

[34] Page, R. L. (2000). Brief history of flight simulation. SimTecT 2000 proceedings, 11-17.

[35] Carrozzino, M., & Bergamasco, M. (2010). Beyond virtual museums: Experiencing immersive virtual reality in real museums. Journal of Cultural Heritage, 11(4), 452–458. doi:10.1016/j.culher.2010.04.001.

[36] Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. Tourism Management, 31(5), 637–651. doi:10.1016/j.tourman.2009.07.003.

[37] Ryan, M. L. (2015). Narrative as virtual reality 2: Revisiting immersion and interactivity in literature and electronic media. Johns Hopkins University Press, Baltimore, United States.

[38] Witmer, B. G., & Singer, M. J. (1998). Measuring Presence in Virtual Environments: A Presence Questionnaire. Presence: Teleoperators and Virtual Environments, 7(3), 225–240. doi:10.1162/105474698565686.

[39] Onoe, Y., Yamazawa, K., Takemura, H., & Yokoya, N. (1998). Telepresence by Real-Time View-Dependent Image Generation from Omnidirectional Video Streams. Computer Vision and Image Understanding, 71(2), 154–165. doi:10.1006/cviu.1998.0705.

[40] Bruno, F., Bruno, S., De Sensi, G., Luchi, M. L., Mancuso, S., & Muzzupappa, M. (2010). From 3D reconstruction to virtual reality: A complete methodology for digital archaeological exhibition. Journal of Cultural Heritage, 11(1), 42–49. doi:10.1016/j.culher.2009.02.006.

[41] Wu, H.-C., Ai, C.-H., & Cheng, C.-C. (2019). Virtual reality experiences, attachment and experiential outcomes in tourism. Tourism Review, 75(3), 481–495. doi:10.1108/tr-06-2019-0205.

[42] Chan, M. A. (2018). Analysing Movement, the Body and Immersion in Virtual Reality. Refractory: a journal of entertainment media, 30, 1-15.

[43] Szymkowiak, A., & Skubis, M. (2019). Why it is worth investigating virtual reality in the context of tourism. Przedsiębiorczość i Zarządzanie, 20(2), 437–450.

[44] Steuer, J. (1992). Defining Virtual Reality: Dimensions Determining Telepresence. Journal of Communication, 42(4), 73–93. doi:10.1111/j.1460-2466.1992.tb00812.x.

[45] 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. doi:10.1016/j.tourman.2017.12.003.

[46] 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. doi:10.1016/j.tourman.2018.10.024.

[47] Beck, J., Rainoldi, M., & Egger, R. (2019). Virtual reality in tourism: a state-of-the-art review. Tourism Review, 74(3), 586–612. doi:10.1108/TR-03-2017-0049.

[48] Rupp, M. A., Odette, K. L., Kozachuk, J., Michaelis, J. R., Smither, J. A., & McConnell, D. S. (2019). Investigating learning outcomes and subjective experiences in 360-degree videos. Computers and Education, 128, 256–268. doi:10.1016/j.compedu.2018.09.015.

[49] Hudson, S., Matson-Barkat, S., Pallamin, N., & Jegou, G. (2019). With or without you? Interaction and immersion in a virtual reality experience. Journal of Business Research, 100, 459–468. doi:10.1016/j.jbusres.2018.10.062.

[50] Van Kerrebroeck, H., Brengman, M., & Willems, K. (2017). Escaping the crowd: An experimental study on the impact of a Virtual Reality experience in a shopping mall. Computers in Human Behavior, 77, 437–450. doi:10.1016/j.chb.2017.07.019.

[51] Bruno, F., Lagudi, A., Barbieri, L., Muzzupappa, M., Ritacco, G., Cozza, A., … Cario, G. (2016). Virtual and Augmented Reality Tools to Improve the Exploitation of Underwater Archaeological Sites by Diver and Non-diver Tourists. Lecture Notes in Computer Science, 269–280, Springer, Cham, Switzerland. doi:10.1007/978-3-319-48496-9_22.

[52] Choi, S. H., & Cheung, H. H. (2008). A versatile virtual prototyping system for rapid product development. Computers in Industry, 59(5), 477–488. doi:10.1016/j.compind.2007.12.003.

[53] Horne, M., & Thompson, E. M. (2008). The Role of Virtual Reality in Built Environment Education. Journal for Education in the Built Environment, 3(1), 5–24. doi:10.11120/jebe.2008.03010005.

[54] Huang, Y. C., Backman, S. J., Backman, K. F., & Moore, D. W. (2013). Exploring user acceptance of 3D virtual worlds in travel and tourism marketing. Tourism Management, 36, 490–501. doi:10.1016/j.tourman.2012.09.009.

[55] Wan, C. S., Tsaur, S. H., Chiu, Y. L., & Chiou, W.-B. (2008). Is the Advertising Effect of Virtual Experience Always Better or Contingent on Different Travel Destinations? Information Technology & Tourism, 9(1), 45–54. doi:10.3727/109830507779637611.

[56] Sofield, T. H. B., & Sivan, A. (2003). From cultural festival to international sport – the Hong Kong dragon boat races. Journal of Sport & Tourism, 8(1), 9–20. doi:10.1080/14775080306242.

[57] Raz, G. (2019). Virtual Reality as an Emerging Art Medium and Its Immersive Affordances. The Palgrave Handbook of the Philosophy of Film and Motion Pictures, 995–1014, Springer, Cham, Switzerland. doi:10.1007/978-3-030-19601-1_42.

[58] Trandafoiu, R. (2019). A Tale of Two (or #EverMore) Festivals: Electronic Music in a Transylvanian Town. Eastern European Popular Music in a Transnational Context, Palgrave European Film and Media Studies, 213–237, Springer, Cham, Switzerland. doi:10.1007/978-3-030-17034-9_11.

[59] Pickering, C., Grignon, J., Steven, R., Guitart, D., & Byrne, J. (2015). Publishing not perishing: How research students transition from novice to knowledgeable using systematic quantitative literature reviews. Studies in Higher Education, 40(10), 1756–1769. doi:10.1080/03075079.2014.914907.

[60] Law, R., Leung, D., & Cheung, C. (2012). A Systematic Review, Analysis, and Evaluation of Research Articles in the Cornell Hospitality Quarterly. Cornell Hospitality Quarterly, 53(4), 365–381. doi:10.1177/1938965512457458.

[61] Pickering, C., & Byrne, J. (2014). The benefits of publishing systematic quantitative literature reviews for PhD candidates and other early-career researchers. Higher Education Research and Development, 33(3), 534–548. doi:10.1080/07294360.2013.841651.

[62] Dixon-Woods, M., Bonas, S., Booth, A., Jones, D. R., Miller, T., Sutton, A. J., Shaw, R. L., Smith, J. A., & Young, B. (2006). How can systematic reviews incorporate qualitative research? A critical perspective. Qualitative Research, 6(1), 27–44. doi:10.1177/1468794106058867.

[63] Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet-The state of eTourism research. Tourism Management, 29(4), 609–623. doi:10.1016/j.tourman.2008.01.005.

[64] Aghaei Chadegani, A., Salehi, H., Md Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ale Ebrahim, N. (2013). A comparison between two main academic literature collections: Web of science and scopus databases. Asian Social Science, 9(5), 18–26. doi:10.5539/ass.v9n5p18.

[65] Pan, Z., Liu, G., & Li, Z. (2007). Virtual presentation and animation of Qingming Festival by the riverside. 2nd Workshop on Digital Media and its Application in Museum & Heritages (DMAMH 2007), 102-105, 10-12 December 2007. doi:10.1109/DMAMH.2007.75.

[66] Armstrong, K. (2021). Virtual Visibility and the Film Festival Circuit. Afterimage, 48(1), 10–18. doi:10.1525/aft.2021.48.1.10.

[67] Dooley, K. (2019). Real and unreal things: virtual reality at the 2018 Adelaide Film Festival. Alphaville: Journal of Film and Screen Media, (16), 132-137. doi: 10.33178/alpha.16.14

[68] Klimek, C. (2018). From programmer to curator: How film festivals are pushing the boundaries of new media and expanded cinema. Canadian Journal of Film Studies, 27(1), 73–87. doi:10.3138/CJFS.27.1.2017-0016.

[69] Baker, C. (2017). A Tradition of Evolution: The Vancouver Indigenous Media Arts Festival. BC Studies: The British Columbian Quarterly, (195), 151-154.

[70] Nichols, B. (2016). IDFA: A festival of attractions. Film Quarterly, 69(4), 82–91. doi:10.1525/fq.2016.69.4.82.

[71] Stevens, K. Virtual futures and cinematic pasts at the 65th Melbourne International Film Festival. NECSUS. European Journal of Media Studies, 5(2), 201–208.

[72] Klein, J. (2011). Breathing, lying, sitting, standing, and walking Finland's ANTI Festival. PAJ - Journal of Performance and Art, 33(2), 94–106. doi:10.1162/PAJJ_a_00043.

[73] Gibb, A., Nicholson, S., & Thomas, G. (2017). Edinburgh Festival Explorer Demo. Adjunct Publication of the 2017 ACM International Conference on Interactive Experiences for TV and Online Video. doi:10.1145/3084289.3089911.

[74] Dieck, M. C. T., Dieck, D. T., & Jung, T. (2021). Exploring Usability and Gratifications for Virtual Reality Applications At Festivals. Event Management, 25(6), 585–599. doi:10.3727/152599521X16106577965152.

[75] Kersting, M., Steier, R., & Venville, G. (2021). Exploring participant engagement during an astrophysics virtual reality experience at a science festival. International Journal of Science Education, Part B, 11(1), 17–34. doi:10.1080/21548455.2020.1857458.

[76] Syu, Y. S., Chen, L. O., & Tu, Y. F. (2018). A case study of digital preservation of motion capture for Bā Jiā Jiāng performance, Taiwan religious performing arts. Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection. EuroMed 2018, 11197, Springer, Cham, Switzerland. doi:10.1007/978-3-030-01765-1_12.

[77] Li, L., Choi, W., Hachimura, K., Yano, K., Nishiura, T., & Tanaka, H. T. (2014). Virtual yamahoko parade experience system with vibration simulation. ITE Transactions on Media Technology and Applications, 2(3), 248–255. doi:10.3169/mta.2.248.

[78] Kwiatek, K. (2012). How to preserve inspirational environments that once surrounded a poet? Immersive 360 video and the cultural memory of Charles Causley's poetry. In 2012 18th International Conference on Virtual Systems and Multimedia, IEEE. 243-250. doi:10.1109/VSMM.2012.6365931.

[79] Polovina, S., Khatri, B. S., & Singh, S. (2000). Culture and Web3D: Experiences in Building a Virtual Beer Festival Site in 3DML. Proc. of British Computer Society HCI Cultural Issues in HCI Workshop, Putteridge Bury, England.

[80] Wang, C.-P., & Tsai, C.-H. (2019). Application of virtual reality to the study of festival culture in aboriginal literature. Proceedings of the 2nd International Conference on Image and Graphics Processing-ICIGP'19. doi:10.1145/3313950.3313975.

[81] Evans, M. K. (2019). "The Name Is Sherlock Holmes, and the Address Is 221B Baker Street": Virtual Reality, Fan Communities, and Tourism. Journal of Popular Culture, 52(6), 1494–1511. doi:10.1111/jpcu.12870.

[82] Robertson, M., Yeoman, I., Smith, K. A., & Mcmahon-Beattie, U. (2015). Technology, society, and visioning the future of music festivals. Event Management, 19(4), 567–587. doi:10.3727/152599515X14465748774001.

[83] Robertson, M., & Yeoman, I. (2014). Signals and signposts of the future: Literary festival consumption in 2050. Tourism Recreation Research, 39(3), 321–342. doi:10.1080/02508281.2014.11087004.

[84] Purwaningsih, M., Purwandari, B., Sunarso, F. P., & Setiadi, F. (2021). Harnessing e-collaboration for rural tourism recovery after covid-19: Dual analysis using SWOT and porter's diamond model. Emerging Science Journal, 5(4), 559–575. doi:10.28991/esj-2021-01297.

[85] Hyun, M. Y., & O'Keefe, R. M. (2012). Virtual destination image: Testing a telepresence model. Journal of Business Research, 65(1), 29–35. doi:10.1016/j.jbusres.2011.07.011.

[86] BBC. (2020). How do I make 360 videos?. Academy Guides. Available online: https://www.bbc.com/academy-guides/how-do-i-make-360-videos (accessed on June 2022).