مجلة جامعة الشارقة للعلوم الإنسانية والاجتماعية

اسم المقال: تطبيق سياحة الواقع الافتراضي في مواقع التراث الثقافي (الدرعية) دراسة حالة
اسم الكاتب: أديب بن عبدالله الخليل
رابط ثابت: https://political-encyclopedia.org/index.php/library/9223
تاريخ الاسترداد: 2026/11/01 18:23 +03

الموسوعة السياسيّة هي مبادرة أكاديمية غير هادفة للربح، تساعد الباحثين والطلاب على الوصول واستخدام وبناء مجموعات أوسع من المحتوى العلمي العربي في مجال علم السياسة واستخدامها في الأرشيف الرقمي الموثوق به لإغناء المحتوى العربي على الإنترنت.
لمزيد من المعلومات حول الموسوعة السياسيّة - Encyclopedia Political، يرجى التواصل على info@political-encyclopedia.org

استخدامكم لأرشيف مكتبة الموسوعة السياسيّة - Encyclopedia Political يعني موافقتك على شروط وأحكام الاستخدام المتاحة على الموقع https://political-encyclopedia.org/terms-of-use

تم الحصول على هذا المقال من موقع مجلة جامعة الشارقة للعلوم الإنسانية والاجتماعية ورفده في مكتبة الموسوعة السياسيّة مستوفياً شروط حقوق الملكية الفكريّة ومتطلبات رخصة المشاع الإبداعي التي ينضوي المقال تحتها.

جامعة الشارقة
UNIVERSITY OF SHARJAH

University of Sharjah Journal

A Refereed Scientific journal

of

Humanities & Social Sciences



Vol. 19, No. 3
Muharram 1444 A.H. / September 2022 A.D.

ISSN : 1996 - 2339

University of Sharjah Journal for Humanities & Social Sciences, Volume 19, Issue 3 September 2022
https//:doi.org/10.36394/jhss/19/3/15

Applying virtual reality tourism to cultural heritage sites: A case study on Al-Diriyah

Adeeb Abdullah Alkhaliel(1)

Received on: 01-11-2020 **Accepted on: 18-01-2021**

Abstract:

Virtual Reality (VR) has existed in various forms since the 1960s and has been known by different terms such as artificial reality, simulator technology, and synthetic environment. The technology used to realize VR has continued to develop applications in discrete domains. In the travel and tourism industry, VR enables tourists to interact with their destinations in great detail, provides travelers with abundant information, and allows users to satisfy diverse motives by participating in activities that accord them with a rich digital experience of locations, including heritage and cultural sites. This paper attends to the general application of VR technologies in tourism, focusing particularly on heritage-based cultural sites to understand the advantages and threats of VR, given the contemporary global circumstances. The article is grounded in the descriptive-analytical approach and combines theoretical as well as field studies through the administration of a questionnaire on tourism and heritage to a wide range of respondents. The questionnaire pertains to virtual tourism at the Al-Diriyah heritage site and probes related expectations, possibilities, and obstacles.

Keywords: virtual reality, heritage sites, virtual tourism, Al-Diriyah, virtual museum, technologies.

(1) College of Tourism and Archaeology - King Saud University (Riyadh - K.S.A.)
aadeeb@ksu.edu.sa

Introduction:

According to Walsh and Pawlowski (2002), numerous studies maintain that Virtual Reality VR is not at all new. Also, VR is defined in discrete terms and denotes a broad range of concepts and technologies representing a sensory relationship with users. Some researchers state that the Sensorium Simulator, a multi-sensory multimedia viewing device invented by Morton Heilig in the early 1960s, may be cited as the first example of VR. The term virtual reality was coined in the mid-1980s; however, the phenomenon was also accorded diverse labels such as artificial reality, computer simulation, cyberspace, virtual environments, augmented reality, and so on.

Tourism is one of the fastest-growing economic sectors across the world. Traveling certainly holds a special fascination. Travelers are motivated by the idea of discovering destinations, learning about their fauna and flora, meeting new people, and savoring other cultures and histories through exposure to their languages, foods, clothes, heritages, customs, arts, festivals, events, and weather. VR experiences oriented to travel can add immense value to the joys of such explorations by simplifying travel-related aspects and enabling tourists to discover and experience more than is currently possible. Augmented and VR technologies are advancing rapidly and could be utilized with great interest by the travel and tourism sector in several ways (Jenny, 2017).

Those responsible for the conservation and protection of heritage and cultural sites fear that the increasing number of visitors at these locations would exert a negative impact on these cultural resources. On the other hand, tourist associations and agencies depend on such heritage sites to attract travelers and seek to increase visitation. (Letellier, 2015). VR technologies could be useful in satisfying the needs of both sides and could help to merge advanced technologies and their users with the tourism experience in general and with heritage and cultural sites in particular.

Literature Review:

Virtual Reality

The rapid evolution of information, communication, and entertainment technologies transforms the lives of human beings every day and ultimately transfigures the characteristics of societies (Jacquemard et al., 2016). Vladimirovna, et al. (2017) state that the rapid growth of information and communication technologies (ICTs) and the changes that have occurred in the structures of information society have considerably influenced models of communication, forms of technology, social and leisure activities, as well as the sectors of business and production. The enormous use of ICT in the rapidly changing world has caused a ubiquity of participation in discrete domains such as economic activities or the socio-cultural sphere and has transmuted modern lifestyles via an information explosion and the modification of systems across all aspects of human life (Boychenko, 2010).

The appearance of the current information and communication society has created digital reality encompassing special and different social, cultural, and consumer practices and has affected innovative processes in all fields of human endeavor (augmented reality). The degree of information development decides the directions and levels of innovations in varied areas of society in the modern world, including the social, political, and economic domains (Vladimirovna et al., 2017).

Lacrama and Fera (2007) define VR as a system of principles, methods, and techniques used to design and create software products that employ multimedia computer systems with specialized peripheral structures offering the potential of change through which all people can perceive corporeal surroundings by simulating and modeling them in an artificial space. Another definition of VR notes that it is the simulation of a real environment that may be experienced visually in the three dimensions (3Ds) of width, height, and depth and that can offer a visually interactive experience in full real-time motion with sound and possibly tactile and other forms of feedback. Thus, VR is a means through which people can

visualize, process, and interact with computers (hardware and software) and experience extreme combinations of data (Onyesolu, 2011).

VR is, moreover, described as containing stereoscopic video inputs that allow each eye to see a different display or video than the other, hence generating a visual simulated reality. Spatial audio accords direction and source-related volume to sounds and also enhances the virtual encounter through a 3D sound experience. The immersion experience is thus maximized for the participant in such an alternate reality (Iab, 2016).

Onyesolu (2011) classifies the main components of VR, especially in its initial stages as 1) hardware components including computer workstation, sensory displays such head-mounted displays, binocular omni-orientation monitor, visual display units or monitors, 3D graphic and sound cards, tracking systems, and input devices; and 2) software components including 3D modeling programs, graphics and digital sound editing packages, and VR simulation systems. VR has currently achieved modern formats such as virtual holographic tours through laptops, smartphones, and tablets.

Walsh and Pawlowski (2002) state that VR technology is becoming increasingly cost effective for application to numerous domains and fields and it is expected to become even more fundamental to human activities in the future.

The Use of Virtual Reality Technology in Travel and Tourism

In recent years, ICT has become a focal theme for tourism researchers because of the effects of the increasing popularity of e-tourism. The use of technologies has increased exponentially in the tourism industry, particularly in terms of the growing attention to virtual worlds. The tourism sector continually develops an abundance of tools and employs digital technology to facilitate interactions between tourists and the world of tourism (Buhalis and Law, 2008). For instance, digital innovations such as central reservation systems and global distribution systems interact with individual customers and have dramatically altered and influenced all sectors of the tourism industry including reservations, transportation, accommodation, and marketing. In fact, the tourism industry has applied

technological innovations and Internet technology over more than half a century to build strategic relationships within the tourism value chain (Gretzel and Fesenmaier, 2009).

Tourism destinations are always seeking creative ways to market their offerings and amplify their tourism-related revenues. VR has been described as the predominant technological development deeply impacting the tourism industry (Tussyadiah, 2017). According to Mofokeng and Matima (2018), the virtual environment is expected to transmogrify all sectors of human activity including the tourism industry.

O'Rawe and Gibson (2017) assert that tourism researchers and tourism professionals currently evince an enthusiastic interest in the applications of VR in the tourism industry even though many of them believe that VR's opportunities in the tourism sector are limited in accordance with the attributes of the tourism activity. Nonetheless, there is certainly a renewed interest for a second or virtual life as a communication and promotional tool for the travel and tourism sector. Guerra et al. (2015) contend that from their beginnings in the Sensorama Simulator in 1962, VR simulators or machines that offer users the experience of 3D images, smells, sounds, movement, and other tactile inputs such as vibrations have been immensely popular. Currently, VR is becoming a common choice for hotels, restaurants, travel agents, and tourism attractions that benefit from the addition of virtual tours as a component of their promotional mix.

Guttentag (2010) elucidates the unlimited impact of VR on the tourism industry through the facilitation of access to tourism destinations, the fostering of increased tourist awareness of destinations, the conservation of fragile sites such heritage and historical locations, the guidance VR can offer tourists, the contributions of VR to increasing entertainment, and the ability of R to extend to global interactions between those who travel. These influences of VR relate to destination-specific experiences and activities of tourists, adding immense value to influences exerted by VR on destination marketing and tourism planning (Griffin et al., 2017).

In addition, discrete travel and tourism establishments such as travel agencies, hotels, and air companies have begun to employ digital realities for marketing purposes, providing tourists with pre-reservation multi-sensory engagement experiences through their services for the entire destination. In fact, some scholars have mooted VR as a substitute mode of traveling and of the consumption of travel-related experiences (Tussyadiah et al., 2017).

Goh (2017) states that the Marriot Hotels initiated a so-called 4D VR experience in 2014 as a major aspect of their creative marketing campaign, offering customers the opportunity to experience particular destinations within a glass cabin resembling a street telephone kiosk. This immersive experience allowed the hotel chain's customers to smell the ocean as they were exposed to visuals of a beach location or to feel the ground shaking as they moved through wormholes.

Cho et al. (2003) assert that after around two decades of using online marketing to support information search and decision-making efforts of tourists, tourism destination marketing endeavors should now be grounded in immersive VR technology to integrate sensory experiences into communication strategies. The experiential nature of tourism products and services would benefit from the tremendous growth in VR technology, allowing tourists to garner plentiful information about destinations, to satisfy their need to better understand the physical characteristics of locations they would like to visit, and to also experience potential destinations in sensory ways before actually visiting them.

It seems that with time, VR technology has transformed the attributes of tourism products. The limitations of the past have been mitigated to a large extent by VR: in the past, the fixed nature of the tourism product, its inability to be moved for sampling by tourists, and the need for travelers to visit locations to know them represented insurmountable barriers that no longer exist.

The Use of Virtual Reality at Heritage and Cultural Sites

A report (2002) by the International Council on Monuments and Sites (ICOMOS) describes tangible and intangible cultural heritage as the mix of value systems, artistic expressions, beliefs, traditions, production, space, objects, and lifestyles of each society as part of human activity that current generations inherit from previous ages. Çizel and Ajanovic (2018) add that cultural heritage represents an integral and important aspect of a culture and pertains to visible traces of a society from its ancient times to its recent history.

A strong relationship may be observed between tourism and cultural heritage, which is globally a preeminent element of appeal for tourists. Culture and heritage are remarkably effective and beneficial for the tourism industry and for the economic and employment-related benefit of locations. Moreover, cultural and inherited destinations also serve as elements essential for the preservation and enhancement of national pride and spirit. Reports by the World Tourism Organization (UNWTO) assert that more than 37% of all international trips include a cultural component (Hadžić, 2004).

According to Xiao et al. (2018), the strong theoretical and applied relationship between heritage and tourism in the final decades of the 20th century may be attributed to the appearance and expansion of varied computer-based visualization technologies that offered novel means of exploration, registration, management, transmission, mobilization, promotion, protection, and preservation of heritage phenomena. Diego et al. (2019) add that urban heritage locations, historical cities, and urban tourism benefit tremendously as the growing significance of computer-based visualization technologies adds value to the management, presentation, and communication of heritage and culture through VR.

Cirulis et al. (2015) report that VR and augmented reality technologies are already commonly applied in discrete fields including media, sport, education, healthcare, military, entertainment, business, engineering, construction, scientific visualization, telecommunications, tourism, and

heritage. Moreover, many new VR opportunities and innovations appear continuously.

Buhalis (2003) points out that the cultural heritage and tourism industry now systematically utilizes information, communication, and multimedia technologies to achieve a competitive advantage by developing tourism destinations. The digitalization of cultural heritage presents opportunities to cultural institutions to attract increasing numbers of visitors for entertainment and experience value in a new and unusual horizon.

The use of digital content has become more reasonable in contemporary technological circumstances. Such digitalized material can also be implemented for the discovery, documentation, conservation, and touring of heritage sites, especially as countries become interested in sustaining national identities in an age of increasing globalization. New technologies have been developed in recent years to facilitate the digital conservation of heritage locations, using 3D models and numerous other forms of digitalization to aid the preservation of small museums and large-scale heritage sites as well as historical buildings such cathedrals and castles (Cirulis et al, 2015).

Finally, VR has introduced many useful applications for the tourism industry through the diverse development of ICTs. VR has been used in many tourism processes and in areas such as planning, management, marketing, and operations (Çizel and Ajanovic, 2018). The list of heritage and cultural sites that are virtually accessible is continuously becoming extended. Plentiful cultural heritage sites of varied types and tourism destinations all over the world have been digitized. Cultural heritage sites and objects can be converted into digital form or virtual 3D models through the deployment of 3D scanning techniques (Cignoni and Scopigno, 2008). Nowadays, tourists can walk around and discover museums in the virtual environment using VR technologies. The customers of travel agencies can now participate in virtual tours and use digitized tour-guide services.

Virtual Museums:

The International Council of Museums (ICOM) defines museums as permanent institutions that are open to the public and that serve society and social development through the acquisition, conservation, research, and exhibition of tangible and intangible cultural heritage items for the purposes of education, study, and enjoyment. Zhao (2019) adds that museums must aim and take responsibility for the protection and promotion of the civic sense of cultural heritage.

In the current environment, the growth of ICT generates novel and divergent surges, waves, and forms of public interest in tangible and intangible cultural heritage properties (Zhao, 2019).

Marcello et al. (2018) note that virtual or digital museums must purpose to collect, organize, and display digital artifacts online. These collections are fundamentally created with educational and entertainment objectives. Compared to their physical counterparts, virtual museums are unrestricted by geography. They can accomplish their instructional and recreational functions and offer users anywhere and at any time a richer experience.

Djindjian (2007) marks that the virtual museum represents the spontaneous outcome of the integration of the traditional museum with the multimedia computer and ICT., The virtual museum dematerializes objects to extend numerous benefits such as providing increased knowledge on the object (intrinsic and extrinsic information, historiographical information, reference information, etc.) and offering all types of visualization (3D, details, physic-chemical analyses, etc.). In fact, in enabling remote visits, the virtual museum dematerializes the archival institution in its entirety. This idea of dematerialization may be applied to traditional museums as closed galleries as well as to cultural heritage sites as open-air museums.

Virtual Tourism in the Era of the Corona Virus

Choudhary (2020) states that outbreaks of diseases have slowed down the growth of tourism and its development in varied countries around the world in recent years. Unstable demand is an integral characteristic

of tourism products, which are vulnerable to unexpected circumstances such as natural disasters, political turmoil, or health-related anxieties. As a result, uncontrollable disasters generate risks related to safety, security, and money in international tourists because the need for change is the primary motivation behind the activity of tourism. Travel is always influenced by both positive and negative dynamics. Therefore, the challenges posed to tourism by the COVID-19 pandemic should be viewed as opportunities of instituting improvements to cope with and overcome the crisis confronting the industry.

The first report of the COVID-19 outbreak was announced by the Chinese government on December 31, 2019. It was later declared a pandemic by the World Health Organization on March 11, 2020. Gretzel et al. (2020) explain that the COVID-19 virus caused an unexpected global crisis in a short time and exerted a massive impact on the political, social, and economic systems of the world. As the negative effects of the pandemic continue to ripple through the world, all governments have issued and implemented hard procedures involving travel bans, stay at home orders, community lockdowns, self- or mandatory-quarantines, and other business-specific restrictions (Gössling et al., 2020). As a result, travel and tourism have literally come to a halt at almost all world tourism destinations. Thus, the economic activities of the airline and hospitality sectors have become minimal in comparison to pre-pandemic levels of activity. Some economies are currently gradually reopening; however, the overall situation remains unstable because of the extreme spread of the virus and the absence of immediate treatment or vaccine.

ICT has become an important enabler since the Internet has made its place in human life and particularly in business, catalyzing all industries including the travel and tourism sectors. In fact, IT has currently become involved with every aspect of the travel and tourism processes, every stakeholder, all establishments, and every sector and sub-sector of the industry (Benckendorff et al., 2019). There are many clear signs that IT has been widely employed during this pandemic, and that it has been adapted and developed to cope with the pressing problems of daily human life

including work, travel, leisure, and diverse economic pursuits.

IT has become a prime factor in the growing elasticity of the travel and tourism industry. It has been highly effective and is even essential in confronting pandemic-related problems such as online learning, education, traveler screening, case and contact tracking, entertainment opportunities during lockdowns, and numerous other issues (Gretzel et al., 2020).

Chirisa et al. (2020) conclude that given the growing fear, the current travel restrictions, and the refusal of people to travel, VR can serve as an alternative tool for people to accomplish their traveling desires visually, without direct contact with people or objects that can cause COVID-19 to spread further. VR can thus act as a safety measure against the pandemic. Virtual tourism has been developed to enhance the appeal of tourism locations and to offer people increased accessibility to their preferred tourism destinations (Jayendran and Rejikumar, 2018). In the ongoing circumstances of the COVID-19 pandemic, VR can become a vital and effective tool for the sustenance of tourism and the maintenance of income inflows to the industry. As people reduce physical leisure travel, they can take virtual tours of tourist sites of their interest from the comfort of their own homes.

AL-Diriyah (A Case Study)

Distinguished open museums represent extensions of momentous phases of history and heritage and encompass an abundance of rich and varied proofs of cultural heritage. Ibrahim (2018) explains that a mud "ghost city" became a UNESCO World Heritage Site in 2010 and was one of the most ambitious restoration projects of the Saudi Commission for Culture and Heritage. This mud city, Diriyah, was the capital of the First Saudi State from 1744 to1818.

The World Heritage Centre (2009) describes Al-Diriyah, located at the heart of the Arabian Peninsula, as the first capital of the Saudi Dynasty. Founded in the 15th century, it was constructed of adobe and bears witness to the Najd architectural style specific to the center of the Arabian Peninsula.

In the 18th and the early 19th centuries, Al-Diriyah's political and religious role increased and the citadel of at-Turaif became the center of the temporal power of the House of Saud. The property includes the remains of many palaces and an urban ensemble built on the edge of the Al-Diriyah oasis.

Zaidi and Kassem (2010) report that the oasis of Al-Diriyah represents a major settlement of this region, established along and at the peripheries of Wadi Hanifah over a distance of approximately 8km. The property is located 5km to the North-West of the center of Riyadh, the capital of Saudi Arabia, and forms the extremity and limit of the conurbation in this direction. The oasis of Al-Diriyah encompasses several agricultural villages. The tip of the plateau forms a limestone promontory known as at-Turaif. It consists of Wadi Hanifah and a tributary and is surrounded by the oasis to the North, West, and South-West.

The Capital Cultural Guide (2019) indicates certain historical facts and figures along with a picturesque aerial photograph that drove me to visit Turaif. In the Bujeiri quarter next to the mosque, I walked over a bridge, crossed the Wadi Hanifah Valley, and carried on to the top of a hill. The Eastern part of at-Turaif opens out toward the desert plateau. The site of at-Turaif was occupied since the 16th century by the local Saudi dynasty, becoming the cradle of the dynasty's development. The Saudis made it the center of their power base, building a settlement, fortifications, and palaces.

At the end of the 18th century, a complete system of fortifications including the citadel of Turaif defended both the banks of the oasis. The citadel was built around Salwa Palace and protects many administrative buildings and Quran schools. This entire region shaped aspects of social life at that time and was controlled by the administration of power and religious instruction. The historic region is still linked to the social life of its adjacent oasis and governs the lifestyles of farmers and craftsmen. Turaif is poised to become a huge open-air museum and cultural center in keeping with the archaeological and historical value of Diriyah (World Heritage Centre, 2009).

Al-Diriyah is the first capital, a historic city, and an area that incorporates heritage neighborhoods that represent a great open museum filled with a historical flavor to which VR technology can be applied for virtual tourist tours of the area. Such an idea can accrue substantial promotional and marketing tourism benefits at the international level.

Methodology:

A total of 375 respondents working in the travel, tourism, and heritage domains were selected for the case study. The first part of the structured questionnaire queried demographic information such as age, gender, marital status, educational qualifications, sector of work, and years of experience. The second part of the questionnaire indicated the application of VR technologies in heritage, cultural, and travel and tourism sites. The questionnaire was based on a 5-point Likert scale in which the participants were asked to select suitable options from the following responses: 1-Strongly agree, 2-Agree, 3-Neither agree nor disagree, 4-Disagree, to 5-Strongly disagree. The descriptive analysis was conducted using IBM SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). The IBM SPSS AMOS version 21.0 was employed to generate a structural relationship of factors related to the VR technology application on tourism and cultural heritage sites.

Results:

Table (1) presents the demographic characteristics of participants. It demonstrates that 63.5% (n=238) of the respondents were males and 36.5% (n=137) were females. Most of the participants 36.3% (n=136) represented the 31–40 age group and the least number of participants were aged above 50 years 10.7% (n=40). In addition, 19.7% (n=74) and 33.3% (n=125) of the participants belonged to the age groups of <30 and 41–50, respectively.

Table (1): Demographic Characteristics of the Participants

# SL	Variables	e	N	%
1	Gender	Male	238	63.5
		Female	137	36.5
2	Age	years 30>	74	19.7
		years 40–31	136	36.3
		years 50–41	125	33.3
		years 50<	40	10.7
3	Marital Status	Single	100	26.7
		Married	246	65.6
		Other	29	7.7
4	Educational Qualifications	High School/Technical	35	9.3
		Under Graduate	82	21.9
		Graduate	118	31.5
		Post Graduate	91	24.3
		Others	49	13.1

Figure (1) depicts the sectors from which respondents participated in the study: 29% (n=110) worked in travel agencies while 25% (n=91) belonged to the Ministry of Culture. The other sectors represented by the respondents included the Ministry of tourism at 20.8% (n=78), private companies at 17% (n=65), and tourists at 8% (n=31).

Figure 1: The work sectors represented by the respondents.

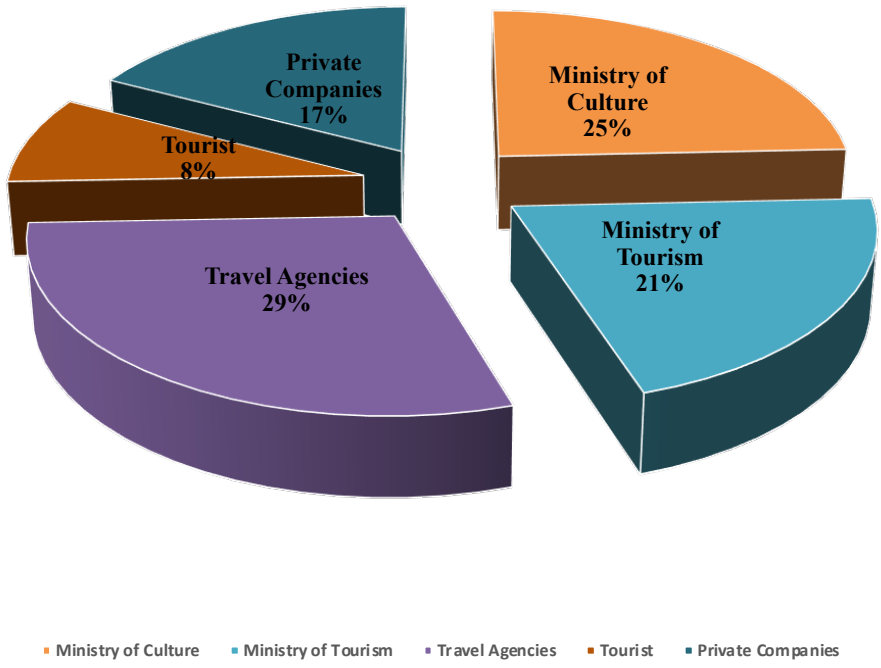


Table (2): Descriptive analysis of factors influencing virtual reality (VR) technology

Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	(%) N	(%) N	(%) N	(%) N	(%) N
Information and Communication Technology (ICT) has greatly changed the general forms of human life	(18.4)69	(44.5)167	(19.5)73	(8.5)32	(9.1)34
Information and Communication Technology (ICT) has exerted great effect, particularly on the tourism industry	(34.7)130	(40.0)150	(12.3)46	(4.0)15	(9.1)34
Virtual Reality technology represents a significant outcome of the modern technological revolution	(42.1)158	(36.5)137	(12.3)46	(2.7)10	(6.4)24
The different applications and forms of virtual reality (VR) technology do not conflict with the human nature of the tourism industry	(27.7)104	(43.5)163	(19.7)74	(2.1)8	(6.9)26

Virtual reality (VR) technology partially offsets the tourist experience, especially in the instances of inability to travel	**(31.2)117**	**(35.7)134**	**(16.5)62**	**(7.5)28**	**(9.1)34**
Virtual reality (VR) technology can be useful in varied domains of tourism including planning, management, development, promotion, and marketing	**(37.1)139**	**(38.9)146**	**(10.9)41**	**(4.0)15**	**(9.1)34**
Virtual reality (VR) technology offers many effective usages in the fields of history and heritage, for example, scientific research, education, conservation, maintenance, and restoration	**(30.1)113**	**(29.9)112**	**(21.9)82**	**(6.1)23**	**(12.0)45**
The rich Al-Diriyah historical and heritage region can be transformed into an open museum and can offer a magical touring experience using virtual reality (VR) technology	**(32.3)121**	**(34.1)128**	**(14.1)53**	**(8.3)31**	**(11.2)42**

Table (2) displays the factors influencing VR technology. With respect to these features, most participants 44.5% (n=167) agree that ICT has greatly changed the general forms of human life. The second-highest number of respondents 43.5% (n=163) believe that the different applications and forms of VR technology do not conflict with the human nature of the tourism industry. Many respondents 37.1% (n=139) concur strongly with the statement that VR technology can be useful in varied tourism fields including planning, management, development, promotion, and marketing. Next, 30.1 % (n=113) of the respondents clearly agree with the assertion that VR technology offers numerous effective uses in the fields of history and heritage, including scientific research, education, conservation, maintenance, and restoration.

Figure (2): The path diagram of factors influencing the use of virtual reality (VR) technology at tourism and cultural heritage sites.

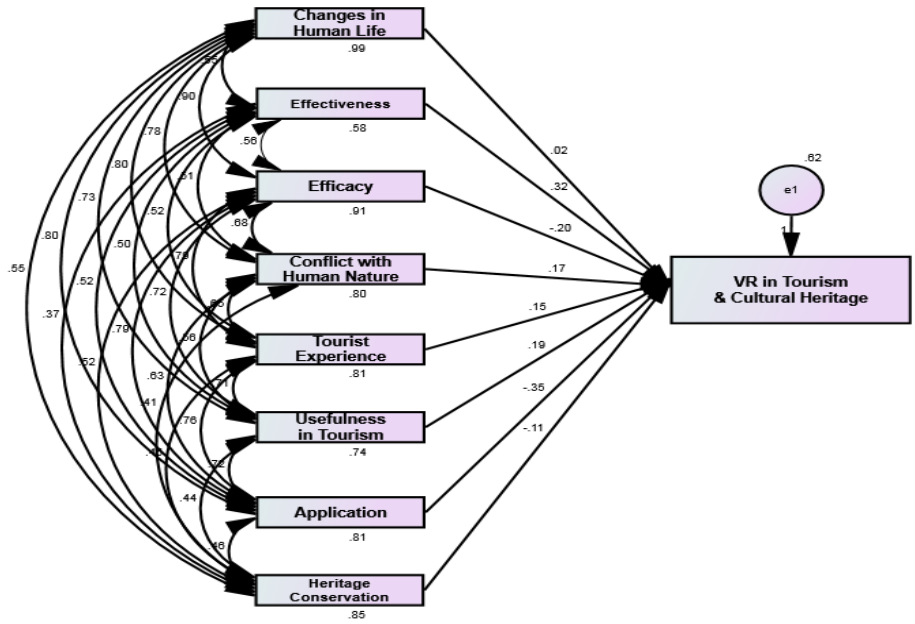


Figure (2) illustrates the structural relationship between factors prompting the use of VR technology at tourism and cultural heritage sites. According to this figure, the construct of heritage conservation exerted a significantly positive influence on VR technology (ß =0.326, t=8.266, p< 0.001) while the construct of usefulness exercised a significantly positive influence on VR technology (ß =0.652, t=11.711, p< 0.001). Constructs such as efficacy, effectiveness, and application also applied a significantly positive influence on VR technology (ß =0.582, t=11.409, p< 0.001) (ß =0.059, t=3.608, p< 0.001), (ß =0.113, t=2, p< 0.001)

Conclusion:

Tourism destinations are always seeking to increase tourism revenues through creative ways of marketing their offers. VR has been described as the most important technological developments to deeply affect the tourism industry in the future. A strong relationship is observed between tourism and cultural heritage. Cultural heritage represents a preeminent element of tourist appeal around the world and is remarkably effective and constructive for tourism. The present study has demonstrated that VR technology can be efficacious in varied tourism-related domains including planning, management, development, promotion, and marketing.

The field study evinced that between 60% and 70% of the respondents registered preferences for strongly agree and agree to the questionnaire statements on the extensive impact of ICT on human life and specifically on the tourism industry, VR technology and its relationship with and influence on the human nature of the tourism industry, the effective role discharged by VR vis-à-vis the tourist experience especially when people were unable to travel, and the different uses of VR with respect to varied tourism-related activities including planning, management, development, promotion, and marketing. Applied to rich historic and heritage regions such as Al-Diriyah, VR can transform such sites into open museums and create magical tour experiences that can aid scientific research, education, conservation, maintenance, and restoration.

Naturally, some respondents (between 10% and 20%) marked that they disagree or strongly disagree with the idea and application of VR technology to tourism in general and to archaeological and heritage areas in particular. Such indications are acceptable because some people remain unconvinced about the ability of technology to compensate for the personal nature and human factors of the tourism industry.

Moreover, the outcomes of the study did not conflict with the emphasis on the capabilities of VR technology as illustrated in Figure 2. Between 50% and 72% of the participants registered positive responses of agree and disagree to items on factors influencing the application of VR technology at tourism and cultural heritage sites, including VR's effective exercise of changes to human life, its efficacy, its effects on tourism experience, and its application on heritage conservation.

The COVID-19 health crisis of 2020 elucidates the significance of focusing on ICT with respect to myriad aspects of human life, especially in times of movement restrictions, long-term mandates to stay at home, and travel and transportation prohibitions. Specifically, the tourism and travel industry is entirely dependent on mobility; in this instance, the relationship between technology and tourism has re-emerged as a crucial consideration. VR has been mooted for tourism through numerous global initiatives at important tourist destinations. Many nations are eager to organize virtual tours to their archaeological and heritage sites and to international museums. The Ad-Diriyah region in the Kingdom of Saudi Arabia represents one such location.

References:

Benckendorff, J, Xiang Z, and Sheldon, J. (2019). *Tourism Information Technology* (3rd ed.). CABI, Boston. https://doi.org/10.1079/9781786393432.0000

Boychenko, V. (2010). Augmented reality: state, problems and solutions. *Proceedings of TUSUR, 1* (21) 161: 165

Buhalis, D. & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the internet--the state of e – tourism. *Research Tourism Management, 29*(4) p. 609: 623 https://doi.org/10.1016/j.tourman.2008.01.005

Buhalis, D. (2003). *E-tourism, information technology for strategic tourism management*. Prentice Hall.

Chirisa, I. Mutambisi, T. Chivenge, M. Mbasera, M. Sidambe, M. Muchenje, B. Mukwashi, T. Mabaso, E. Ncube, R. and Zengeni, D. (2020). *Scope for virtual tourism in the times of covid-19 in select African destinations*. DOI: 10.31901/24566756.2020/64.1-3.2266, Research Gate, publication at: https://www.researchgate.net/publication/344126737

Choudhary, C. (2020). Corona (Covid-19) and tourism: moving forward in the aftermath of the fall. *Research Gate*, DOI: 10.13140/RG.2.2.36191.41128

CITATIONS, this publication at: https://www.researchgate.net/publication/340829722

Cho, Y. Wang, Y. and Fesenmaier, D. (2003). Searching for experiences - the web- based virtual tour in tourism marketing. *Journal of Travel & Tourism Marketing, 12*(4) p.1: 17. https://doi.org/10.1300/J073v12n04_01

Cignoni, P. & Scopigno, R. (2008). Sampled 3d models for CH applications: a viable and enabling new medium or just a technological exercise? *ACM Journal on Computing and Cultural Heritage, 1*(1), 2-23. DOI:10.1145/1367080.1367082

Çizel, B. and Ajanovic, E. (2018). *Virtual reality for cultural heritage tourism* [Conference Paper] https://www.researchgate.net/publication/329769312, DOI: 10.15308/Sitcon-2018-131-134

Cirulis, A. De Paolisb, L. and Tutberidze, M. (2015). *Virtualization of digitalized cultural heritage and use case scenario modeling for sustainability promotion of national identity, ICTE in regional development.* www.sciencedirect.com, Doi: 10.1016/j.procs.2015.12.384

Diego A. Timón, B. and Giralt, C. (2019). The historic city, its transmission and perception via augmented reality and virtual reality and the use of the past as a resource for the present: a new era for urban cultural heritage and tourism? *Sustainability 2019, 11*, 2835; doi: 10.3390/su11102835

Djindjian, F. (2007). *The virtual museum: an introduction*. Research Gate. https://www.researchgate.net/publication/29686127

Goh, L. (2017). *How are Digital Realities Transforming the Travel Experience and what Potential and do They bring for the Travel Business Sabre*? https://www.sabre.com/locations/apac/how-are-digital-realities-transforming-the-ravelexperience- and-what-potential-do-they-bring-for-the-travel-business/

Gössling, S, Scott, D, Hall, C. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *J Sustain Tour*. Https://doi.org/10.1080/09669582.2020.17587 08

Gretzel, U. and Fesenmaier, D. (2009) Information and technology: shaping the past, present and future of tourism. In M. Robinson (Ed.). T*he SAGE Handbook of Tourism Studies*. Tazim Jama

Gretzel, U. Fuchs, M. Baggio, R. Hoepken, W. Law, R. Neidhardt, J. Pesonen, J. Zanker, M. and Xiang, Z. (2020). E-Tourism beyond COVID-19: A call for transformative research. *Information Technology & Tourism, 22*:187–203. https://doi.org/10.1007/s40558-020-00181-3

Griffin, T. Giberson, J. Lee, S. Guttentag, D. and Kandaurova, M. (2017). *Virtual reality and implications for destination marketing*. Travel and Tourism Research Association: Advancing Tourism Research Globally TTRA International Conference 2017.

Guttentag, A. (2010). Virtual reality: applications and implications for tourism. *Tourism Management, 31*(5), 637: 651. https://doi.org/10.1016/j.tourman.2009.07.003

Hadžić, O. (2004). Tourism and digitization of cultural heritage. *Institute za matematiku, Novi Sad*, 5, 74: 79.

ICOMOS (2002). *ICOMOS international cultural tourism charter: principles and guidelines for managing tourism at places of cultural and heritage significance*. International Committee on Cultural Tourism.

IAB, (2016). *IS virtual the new reality, a market snapshot of VR publishing and monetization*.

Ibrahim, A. (2018). *The Arab states' UNESCO world heritage sites: the Saudi Arabia experience*. Research Gate.

https://www.researchgate.net/publication/323446317

International Council of Museums (2008). *ICOM definition of a museum*. http://archives.icom.museum/definition.html

Jacquemard, T. Monaghan, D. O'Connor, N. Novitzky, p. and Gordijn, B. (2016). *The convergence of virtual reality and social networks – threats to privacy and autonomy*.

Jayendran, L, and Rejikumar, G. (2018). A study on the potential benefits of applying virtual reality in travel and tourism for better destination image. *International Journal of Pure and Applied Mathematics*

Jenny, S. (2017) *Enhancing tourism with augmented and virtual reality* [Bachelor's thesis Degree Program in Business Information Technology]. Visamäki.

Lacrama, D and Fera, D. (2007). Virtual reality annals. *Computer Science Series, 1*, 137: 144

Letellier, R. (2015) *Virtual reality ... a new tool for sustainable tourism and cultural heritage sites management*. Heritage VR Group Canada

Marcello, C. Marianna, C. Franco, T. Chiara, E. and Massimo, B. (2018). Comparing different storytelling approaches for virtual guides in digital immersive museums [paper presentation]. International Conference on Augmented Reality Virtual Reality and Computer Graphics 2018. Springer

Mofokeng, N. and Matima, T. (2018). Future tourism trends: Virtual reality based tourism utilizing distributed ledger technologies. African Journal of Hospitality, Tourism and Leisure, 7 (3) p.1:14 - ISSN: 2223-814X Copyright: © 2018 AJHTL - Open Access-Online @ http//: www.ajhtl.com

Onyesolu, M. (2011) Understanding virtual reality technology: advances and applications. Research Gate. DOI: 10.5772/15529 · Source: In Tech

O'Rawe, M. and Gibson, A. (2017). Virtual reality as a promotional tool: insights from a consumer travel fair. In T. Jung & M.C. Tom Dieck (Eds.). Augmented Reality and Virtual Reality - Empowering Human, Place and Business (pp. 93-107). Springer. https://doi.org/10.1007/978-3-319-64027-3_7

The Capital Cultural Guide (2019). Dive into Riyadh's culture. G20 Saudi Arabia 2020

Tussyadia, I. Wang, D. & Chenge, J. (2017). Virtual reality and attitudes toward tourism destinations. Springer International Publishing. https://doi.org/10.1007/978-3-319-51168-9_17

Vladimirovna, E. Bronislavovna, T. Konstantinovna, O. and Glumova, G. (2017). The influence of virtual information spaces on tourism development. Revista, Espacios,.48(49), 22-29.

Walsh, K. and Pawlowski, S. (2002). Virtual reality: a technology in need of is research. Communications of the Association for Information Systems, 8(20), 296-314. https://doi.org/10.17705/1CAIS.00820

World Heritage Centre (2009). At-turaif District in ad-diriyah. Saudi Arabia, 1329, World Heritage Convention, Annex 3.

Xiao, W. Mills, J. Guidi, G. Rodríguez, P. Barsanti, G.; González, D. (2018). Geo informatics for the conservation and promotion of cultural heritage in support of the unsustainable development goals. *ISPRS J Photogram. Remote Sense*. https://doi.org/10.1016/j.isprsjprs.2018.01.001

Zhao, Z. (2019) *Engaging audiences in virtual museums by interactively prompting guiding questions*. Hong Kong University of Science and Technology, arXiv:1902.03527v1 [cs.HC]

Zaidi, F. and Kassem, O. (2010). *Use of electrical resistivity tomography in delineating zones of groundwater potential in arid regions: A case study from Diriyah region of Saudi Arabia, Arab J Geosci (2012)*. 5:327–333 DOI 10.1007/s12517-010-0165-7 Saudi Society for Geosciences 2010. https://doi.org/10.1007/s12517-010-0165-7

تطبيق سياحة الواقع الافتراضي في مواقع التراث الثقافي (الدرعية): دراسة حالة

أديب بن عبدالله الخليل[1]

ملخص البحث:

تكنولوجيا الواقع الافتراضي ليست كما يعتقد البعض حديثة العهد، وإنما بدأت بأشكال مختلفة منذ الستينيات من القرن الماضي متخذه أسماء عدة مثل (الواقع الاصطناعي)، (تكنولوجيا المحاكاة) و(البيئة الاصطناعية). بصفة خاصة في صناعة السياحة والسفر تسمح هذه التكنولوجيا للسائحين بالتفاعل مع المقصد بفيض من المعلومات، وتجربة الأنشطة السياحية تجربة فريدة رقمية ثرية، والتي يمكن تطبيقها في المواقع التراثية والثقافية لأسباب عديدة. تقوم الدراسة الحالية على دراسة تطبيق تكنولوجيا الواقع الافتراضي في السياحة بشكل عام وفي المواقع الثقافية والتراثية بشكل خاص لفهم مزاياها وعيوبها، خاصة فى ظل التطورات المتلاحقة والأزمات العالمية. تعتمد الدراسة على المنهج الوصفي والتحليلي وتشمل الدراسة النظرية والدراسة الميدانية مع استبيان موجه إلى مجموعة واسعة من المعنيين بالسياحة والتراث. يناقش هذا الاستبيان إمكانيات وعقبات وتوقعات السياحة الافتراضية في منطقة الدرعية التراثية.

الكلمات الدالة: الواقع الإفتراضي، المواقع التراثية، السياحة الافتراضية، الدرعية، المتحف الافتراضي، التقنيات.

(1) كلية السياحة والآثار- جامعة الملك سعود (الرياض - المملكة العربية السعودية)
aadeeb@ksu.edu.sa