

The Role of Virtual Museums in Restarting Tourism Post-Covid19

Dr. Emadeddin Ahmed Ahmed Abuelenain
Assistant Professor, University of Sharjah, College of
Arts and Humanities, History and Islamic Civilization
Department, Tourism Guidance Major.
eabuelenain@sharjah.ac.ae

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ABSTRACT:

Virtual museums are designed as interactive websites in which information is communicated smoothly by allowing the possibility of 3Dvirtual tours in the museum and obtaining information through a database. These websites represent virtual entities in order to display a number of museum holdings that exist in different places with the possibility of commenting on them. Additionally, these museums rely on digital audio and visual technologies created on the Internet with the aim of promoting a museum. It is possible that this museum does not have a real presence on the ground to preserve artifacts like paintings, pottery, and sculptures and the like.

The current study explores this new boom (the era of electronics, computers, the international information network, e-mail and other achievements and developments that made it easier for people to obtain high speed and accurate information about any place, from their homes). The use of modern technologies has an important and pivotal role in distinguishing the work of the tourist guide, especially by relying on virtual reality techniques that contribute effectively to simulating the natural reality of tourist attractions. The main aim of this study is to focus on how to improve virtual museums to help people with special needs and qualifying tourist guides in the use of modern technologies, scientific tourism, and educational, academic and artistic museums. These museums contain an integrated virtual electronic guide that contains all the information related to tourist attractions and archaeological sites that could be useful for tourists.

The research then investigates potentialities of working to increase the average number of nights of residence, by expanding the base of tourist attractions of all kinds to overcome the problem of seasonality and reducing the prices to encouraging incentive tourism and holding carnival shows to attract tourists to spend more days and nights in the tourism destination.

This research first examines relevant literature on possibility to develop virtual museums' important and pivotal role in spreading the culture of tourism and the development of the tourism processes from the

traditional towards the modern style that depends on artificial intelligence techniques. Findings revealed that modern technologies have an important and pivotal role in the development of tourism and facilitate the processes of museums to integrate practical reality with virtual reality. The study provides recommendations that could encourage more tourists to enjoy their visit and improve marketing efforts, to increase the number of visitors of tourist destinations.

Key words: Virtual – Museums – Technology – 3D – Covid-19, UAE

Introduction:

Museums used to be a place where unique antiques and valuable pieces of high value were preserved in order to protect them from damage and to safeguard them. They are used to be visited by tourists to enjoy the ancient cultural heritage remains and learn about their history and civilization. It is so vital for any country in the world to establish museums in which valuable antiquities are preserved. Each museum dates back to a certain era is significant to the destination's civilization. However, the current COVID-19 pandemic has introduced new variables to that traditional physical concept of museums. Due to the emergency circumstances that the world is going through, the so-called virtual museums were introduced.

A large percentage of computer users today are fond of the 3D games dating back to the early 1990s. However, nowadays, players have more sophisticated graphics, which express soft 3D environments that are completed with realistic lighting and live colors. Here comes the role of 3D computer glasses. Interactive virtual reality glasses are devices that are more sophisticated. (Al-Hajji, 2014, p. 573).

Virtual tours are an effective tool used over the Internet to display some archaeological and tourist sites as well as the museum use in education. Virtual tours over the Internet can be provided in the classroom where they help learners understand the curriculum. In this study, we will show the position of virtual museums of this type of virtual reality environment and application. Virtual museums are for not only tourists or entertainment, but also for scientific, educational, academic, and artistic aspects. All these types of museums and the virtual reality technologies can be used and is useful even in non-crisis days as well as the COVID-19 outbreak.

Most museums and archaeological sites around the world were closed after the crisis and quarantine decisions were issued in many countries. Many museums around the world began to provide the feature of virtual tours of their components. The UAE's experience in the field of virtual museums was not the only one. Rather, many countries in the world adopted the same idea and implemented it. As follows, this research will tackle a number of examples of virtual museums around the world.

Research Importance:

The importance of studying this topic is that the virtual presentation of archaeological collections offers the possibility of watching museums' holdings displayed in the museum halls the same way it is displayed in

traditional museums. It would even develop new types of museums and will allow tourists to visit sites that were not possible to visit in normal circumstances. Online technologies allow the possibility of creating a collaborative project between several museums and institutions to provide an overseas experience that was impossible for some tourists. The recent development of virtual technologies will help in solving problems arising from the crisis of COVID-19 outbreak.

Research problem:

The problem of this study lies in the need to focus on the virtual museums during COVID-19 crisis and to work on developing museums around the world to convert them into virtual museums to facilitate for tourists to watch historical and architectural sites. Virtual museums could be the solution to the current crisis and the way tourism could restart after the pandemic. The study will tackle some factors that could affect the tourism experience such as the benefits, the acceptance, the purpose and the approach of using virtual reality.

Research Hypotheses:

Tourism restart is significantly affected by:

- Virtual Museums importance to visitors and countries (H1)
- Enriched experience of tourists (H2)
- Destination Competitiveness through virtual museums (H3)
- Economic return of Virtual Museums

Research aim and objectives:

The aim of this research is to increase, develop and work on virtual museums to provide tourists with several services that they were deprived from due to the lockdown. Virtual museums will make it easier for some tourists to visit destinations. They will also preserve museum holdings, provide a safe environment for them, and reduce the costs of establishing new museums. They will also provide the opportunity to visit sites that were hard or impossible in normal times or virtually exhibit some historical incidents to make the new generations more loyal and patriotic.

Definition of Virtual Reality:

The term virtual tour is defined as “a simulation of an existing location that is composed of a sequence of video images”. Virtual reality is meant to be a series of films or images that is supplemented by written explanations, aural instructions, and/or music. It is meant to relocate and recreate the actual experience in a virtual world of its own. It can be reproduced all around the globe by using either a computer, 3D television or a 360 pair of VR glasses. The tourist can enjoy watching and intermingling with the virtual surroundings as they do in the real environment. (El-Said & Aziz, 2021)

The Concept of the Virtual Museum:

Virtual museum is a website or application that is created on the Internet, and it represents a virtual entity in order to display a number of museum holdings that are located in one or several of museums. It also provides the possibility of providing many museum services such as doing research and studies that can be published and associated with these

holdings and commenting on them by tourist guides. In other words, they are museums that rely on digital audio-visual technology that are established on the Internet with the aim of introducing museums' activities. It is possible that this museum will not have a real presence on the ground; that is in order to preserve artifacts such as paintings, portraits, clay pots, sculptures and the like, and researching their history, and then publishing this information based on a comprehensive database. (El-Said & Aziz, 2021)

The design of a virtual museum requires three basic stages:

1. Information collection (archiving),
2. Photography and videography,
3. Data, photos and videos conversion to digital and virtual information.

The collection of information is in order to build a database that is comprehensive on all information, including definition of exhibits, the culture of the society, and customs and traditions. As for photography and videography stage, it starts by giving the typical character of exhibits, and then comes the stage of converting images and videos- using some digital techniques -into information in which a database is formed to be used in the virtual museum. (Al-Hajji, 2016)

Virtual Museum Purposes:

The study defines the general basic purposes that represent the roles of virtual museums as stated by Al-Hajji (2014) p. 132 as follows:

1. Motivate a person to pay more attention to the original exhibits in real museums.
2. Activate sensual perceptions such as those that depend on sound, touch, odor that are usually not available in real physical museums.
3. Direct visitors in art museums to find paintings easier.
4. Increase awareness of other stored work of arts.
5. View the holdings in a context within the related facts
6. Conceive the techniques used, such as view and clarity.
7. Revive and repair paintings and archaeological sites.
8. Bring and collect holdings in an illusory space, which cannot be collected in the real world as well as those that were not previously collected in a real museum.
9. Display exhibits at remote locations.
10. Show sites that are not open to the public.
11. Explain the historical background of the exhibits.
12. State the history of the museum.

History of Virtual Museums:

Museums and heritage sites have been altered throughout history. The idea of watching cultural sightseeing and historical relics has started only during the last century. They have been developed from just a place focused on the heritage site to display related holdings and events or to deliver an experience about this location into becoming more tourist

oriented to allow more enjoyment, interaction, and learning. (Pisoni, et al., 2021)

Virtual museums are not new to history too as they have developed to be an efficient instrument in displaying historical and archaeological sites. It has been also improved from just providing a couple of applications such as interactive maps, 360° tours, and live-streaming webcams to display historical holdings or events into a recognized means of interaction due to the enhanced technology of engagement and realism using methods of animation and communication. (Viñals, et al., 2021)

Museums in the United Arab Emirates and their Importance:

The United Arab Emirates is characterized by the presence of a number of museums that is unique in their specialties, the scarcity of their exhibits that narrate the history of the Arabian Peninsula and the way they display the development of life in the Arab Gulf states. Every visitor to the Emirati cities visits a large number of museums with huge buildings, which are characterized by striking architectural designs drawn from the Islamic architectural style. Museums are varied between the Louvre Museum in Abu Dhabi, the Sharjah Museum of Archeology, the Museum of the Union of the Emirates in Dubai and the museum of aviation history. They have attracted thousands of tourists on a daily basis from various Asian, European and Arab countries, before the spread of COVID-19 pandemic. (Shaath, 2002)

After the spread of COVID-19, most museums and archaeological sites around the world were closed, and quarantine decisions were issued and entered into force in many countries, including the UAE. Many museums around the world began to provide the feature of virtual tours on their websites, and to present their precious holdings using virtual reality techniques. Examples of which in UAE are the following:

Dubai Museums have made virtual tours of their museums via the Dubai 360 website partnered with the Dubai Culture and Arts Authority. Through this partnership, Dubai 360 also provides Internet users with the ability to see panoramic scenes from overhead view for all the city's historical and ancient treasures, through a wide range of panoramic images and interactive videos captured with slow imaging technology. "Dubai Culture" has initiated to create the best experiences for the public and accordingly, the site offers the possibility of conducting unique tours of various sightseeing by taking advantage of interactive techniques and panoramic images with full angles in addition to successive images and videos. By taking advantage of these advanced technologies, tourists can see the historical sites from unique angles they have not seen before. The virtual visit includes the Union Museum, the Nayef Museum, and the Sealed Coins Museum, the Dubai Museum as well as the historic Fehidi neighborhood. (Alarab, 2020)

The guided tours and virtual workshops organized by the Culture and Arts Authority in Dubai "Dubai Culture" played a major role in attracting people to the Union Museum through the "Dubai 360" website, where more than 2300 students from 14 schools managed from all parts of the UAE.

Dubai Culture provided 67 virtual tours for school students between April 28 and May 28, 2020, which led to the formation of remarkable success to this initiative organized by the authority in cooperation with the Ministry of Education and Dubai Education and the Knowledge and Human Development Authority. Moreover, this step was aimed at enhancing the importance of museums to emerging generations in the UAE, and seeking to enrich their knowledge about the Emirati civilization and to strengthen their ties with the Emirati cultural identity by creating innovative interactive channels. The initiative provides school students with pre-booked guided tours, accompanied by a cultural guide who provides them with a detailed explanation of all departments using the "Dubai 360" website. "Dubai Culture" added the Shindagha Museum and other museums that are located in the Emirate of Dubai to the virtual tours available through the "Dubai 360" website. (Al Bayan, 2020)

Virtual Museums around the World:

Several theme parks, museums and iconic landmarks are planning to take measures to reduce the crowd when they resume during the COVID-19 crisis. SeaWorld Orlando is planning to decrease the communication with animals despite it is the most attractive feature presented. Universal Orlando Resort, Disney, and Six Flags would turn into online for either reservation or virtual events they offer. Smithsonian museums, the National Zoo in Washington and the Louvre are planning to limit the number of visitors and the working hours. Some museums would apply call-first method to keep safety and security of their visitors. (Sampson & Compton, 2020)

It is significant that various museums around the world have been engaged in virtual tours and activities to give their tourists the opportunity to enjoy the cultural experience even from home. For example, the Louvre Museum used virtual reality to memorialize Leonardo DaVinci's death anniversary; "The British Museum in the United Kingdom, the Museum of Modern Art in the United States, and the Van Gogh Museum in the Netherlands" present various virtual tours and even exhibitions and collected items from further museums. Egypt also initiated the "Explore Egypt from Home" program through their social media networks that presented five important heritage sites as well as a group of virtual tours for various museums. (El-Said & Aziz, 2021)

[Google Arts and Culture](#) has been affiliated with thousands of museums and galleries all over the world to present virtual tours of their holdings. (Theconversation, 2020)

The previously mentioned experiences in the field of virtual museums were not the only examples. Rather, many countries in the world adopted the same idea and implemented it successfully. As follows, this study will mention a number of examples of virtual museums around the world as stated by Romano, (2020) as follows:

- Guggenheim Museum - New York:

Google has provided visitors with the advantage of virtual tours through the museum's famous spiral staircase, where scenes can explore the

artwork of the Impressionist and Post-Impressionist schools, as well as the recent and current schools.

- The National Museum of Art - Washington:

The well-known American Art Museum has couple of exhibitions, the first exhibition showing “American fashion” from 1470 to 1895, comprising several clothing designs from “the ancient colonial and revolutionary ages”.

Another exhibition is a group of works by the Dutch Baroque painter Johannes Vermeer.

- Orsay Museum, Paris:

The visitor can remotely identify the contents of the museum, which includes many legendary works by French artists who lived between 1848 and 1914 such as Monet, Cézanne, Gauguin and others.

- The National Museum of Modern and Contemporary Art - Seoul:

The Seoul National Museum consists of six floors, which is one of the most important museums in South Korea, and displays paintings from contemporary art by artists from South Korea and from all over the world as well. All of this can be seen by visiting the museum's website on the Internet.

- Pergamon Museum, Berlin:

It is one of the largest museums in the German capital, and it is home to many ancient artifacts, among them Babylonian and Assyrian artifacts. The most important of which is the Bergamon Altar. Google Arts and Culture provides the ability to visit the museum through a dedicated link.

- The Rijksmuseum, Amsterdam:

This museum contains more than 200 artworks from the paintings of the Dutch Golden Age artists, including the works of Vermeer and Rembrandt, as well as statues and models of applied arts works.

- J. Paul Getty Museum, Los Angeles:

It is an American museum located in the state of California, and receives more than two million visitors annually. The museum's collection includes pieces of Western arts for the middle Ages, as well as artwork from Greece and ancient Rome, and a vast group of statues, manuscripts and photos, which is available for virtual visit by clicking a link and wandering to see all these artifacts.

- The Uffizi Gallery, Florence

It is considered one of the oldest and most famous art museums in the West. The exhibition is located in the Uffizi Palace in the Italian city of Florence. The palace was first built as an office for city judges, then it turned into an art gallery, and it displays unique artistic treasures dating back to the Italian Renaissance.

- Museum of São Paulo, Brazil:

It is the first non-profit museum of modern art in Brazil, and it is considered one of the most prominent features of Brazil. What distinguishes it is its architectural design that represents the modern architecture of

Brazil, where it stands completely on two columns, with a large glass interface that extends over the entire museum.

Virtual Museums as an Educational Tool:

Virtual tours are an effective tool used over the Internet to display some archaeological and tourist sites. It significant to use it in education. While referring to the role of virtual tours in improving learning, the study defined it as: "Digital representation of a site through which the learning experience can be improved, where the tour often includes texts, panoramic pictures and sounds. " (Al-Mashukhi, 2015: p. 30)

Virtual tours can be defined as interactive environments that represent real or imaginary places digitally using multiple media over the web that allows the learner to interact with them without leaving the classroom and without being bound by the limits of time or place. (Al-Mashukhi, 2015: p. 32)

From the previous definitions, there is an intersection between the virtual tours and the virtual museums in several points: (Al-Mashukhi, 2015: p. 34)

1. Digital representation of environments.
2. Use multiple means in this representation.
3. Web-based environments.
4. Interactive environments that the learner can interact with in varying levels of interaction
5. Represent different places that may have a presence on the ground.
6. Provides the visitor with a sense of movement or walking.

Thus, virtual museums can be considered a form of virtual tours, as virtual tours may be represented by open or closed places such as parks, archaeological sites, scientific sites, or virtual museums of all kinds (historical, archaeological, scientific, technological, medical, etc...).

After the emergence of package tours and group tourist trips in the mid-nineteenth century in England that include all individual and separate components such as transportation, accommodation, catering, entertainment, sightseeing, etc..., the presence of tourist guide was essential. He was the only person capable of controlling these groups, monitoring their movement, bringing them to their destinations, and achieving their goals easily. Thus, the contemporary concept of tourism guidance appeared. (Ansari & Awad, 2001)

The advancement of computer technology in the field of simulation and three-dimensional modeling has the strength and speed, and advanced components that can turn stereoscopic images into a realistic way (Al-Kayyali, 2004). Here comes the role of 3D computer glasses; they are designed to convince the mind that what you see are real 3D items that surround you. (Al-Hajji, 2014: p. 573) Interactive virtual reality glasses are devices that are more sophisticated; the idea is for the computer to generate two images, each of which is at a separate time (Al-Hajji, 2014: p. 128)

Tour guides can benefit from many modern technologies that enable them to practice their profession in tours in desert areas, among which are

the techniques of electronic maps (GPS) that contain many data on positioning and maps of the archaeological sites located in the desert and the areas of tourist resorts. Tourist guides can benefit greatly and directly from the techniques of electronic devices for measuring altitudes and using devices for measuring the depth of water, which facilitate easy access to tourism areas. The tour guide can also use many electronic devices for expelling insects and reptiles of all kinds for the purpose of camping in those areas. (Salem, 2012)

The Importance of Virtual Museums during the Pandemic:

After the pandemic restrictions, museums should be more active, digital, and adopt less expensive policies to be managed. Large museums may also plan for a long-lasting closing later than less visited local ones. Museums have a very essential role in cooperating with public health bodies to assist the society focusing on how to encourage tourists to resume visiting museums. The crisis could be an opportunity to change the traditional way of thinking of global museums by benefiting from the crisis in establishing their cultural role and looking after their society's heritage. This pandemic helped in rediscovering the social role of museums in preserving heritage to confront the state of insecurity caused by the crisis. (Cobley, et al. 2020)

Social media is one of the main virtual concepts that drive tourism growth and strengthen the use of virtual reality. Recently, it became an important factor in promoting cultural and heritage tourism and other types by means of digitalization. It proved to be an essential factor for digital tourism that can cross borders and fulfill cooperation among tourist markets and destinations. (Akhtar, et al., 2021)

Cultural tourism is one of the types that would be promoted from virtual reality applications as tourists would be aware of the same tourism experience would work as an intermediary between experience and feelings. Consequently, virtual reality is affecting "purchase decision" in cultural-related tourism services. (Akhtar, et al., 2021)

Space tourism is one of the types of virtual tourism that belongs to "astrotourism" alternatively used to actual travel into the stratosphere utilizing a simulator of "spaceflights". Space tourism has various elements: "stratospheric flights, suborbital flights, low-orbit space flights and, virtual flights". Some of the spaceports include observatories of rocket launchers, shuttle launchers, space museums, space Telescope Theater, astronaut training simulators, deep space exploration, space hotels, and guided tours about the history of spaceflight and astronomy. Examples of spaceports that offer such services to the visitors are Cape Canaveral, Florida, called Florida's Space Coast, Kennedy Space Center, the Air Force Space and Missile Museum, Mercury 7 Monument, NASA's Space Shuttle Program, Mars Rover, IMAX Theater, Cosmodrome Baikonur (Kazakhstan), and Hubble space Telescope Theater. (Pásková & Budinská , 2021)

Drone tourism is giving a fascinating experience of virtual tours that cannot replace physical tours but could be a suitable alternative at the time

of crisis. It can also provide an eco-friendly experience to solve environmental issues related to tourism. It is more exciting experience than ordinary videography and photography by offering programs and resources for enjoyable, realistic, and creative virtual tourism. The most likely usage of drones is in offering digital virtual excursions of “open-space” tourist sightseeing. It is not only confined to the use at the time of crisis such as the current pandemic, but drones also offer virtual tours in regular circumstances especially for disabled or tourists who would like to take pictures from a unique angle. (Ilkhanizadeh, et al., 2020)

Museum Management Post COVID-19:

Right after COVID-19 outbreak, museums started to use new management techniques through communication channels based on the internet namely “digital multimedia platforms”. The current crisis has changed museums’ management to be more positively creative and productive. It changed its role from just suppliers to more socially committed and involved by introducing free online platforms and being more open to the public. The challenging situation made them more sustainable in managing the priority for co-formation of value as an efficient tool for the resolution of the crisis. After COVID-19, museums management would be completely different, as it will depend on the tourist participation, communication and involvement. (Choi & Kim, 2021)

Museum experiences involve some social and personal human interaction with the displayed items. That is to go and interact physically to enhance the feelings of the visit and touch the essence of history and heritage and increase the satisfaction and amusement of the cultural heritage site and the message it expresses. On the other hand, disabled visitors would need some helpful techniques to make their visit enjoyable. Some methods- such as specially designed applications- would also make the blinds’ guided tours of some benefit not only in pandemics lockdown, but also in normal times. Virtual reality specially designed websites for disabled people would make it possible for them to move around the museum while saying some commands that will allow them to recognize the displayed items and live in the virtual environment. This will make their visit more suitable to their level of accessibility and offer them some measures to suit their disabilities whether physical or intellectual that includes “vision, mobility, hearing, and cognition scores”. (Pisoni, et al., 2021)

Simultaneously, tourism providers are participating in digital engagement to involve their tourists on worldwide virtual programs. To cite an example, Airbnb presents virtual experiences, social media tourism influencers resume delivering digital entities for their tourists, and tourism providers operate a variety of virtual networks to keep tourists’ loyalty and encourage potential customers. (Ulrike, et al., 2020)

Museums and the Crisis:

Although virtual tourism does not give the same experience compared to the mass tourism, it is still attracting tourists especially after the pandemic. This requires further development of the virtual features and

techniques to satisfy the potential tourists. Virtual tourism is the most secured alternative for tourists during such crisis. Tourists can enjoy visiting new sightseeing without moving from their houses. This new experience was encouraged by the advancement of the virtual reality and the use of 360-degree in tourist destinations. (Akhtar, et al., 2021)

Tourists are so hesitant to resume travelling until restrictions are lifted and destinations are in a comparable position. That is the reason why they think of virtual tourism as the right alternative during that period of uncertainty. Tourism is not anymore, the means of interaction among nations as borders are already closed due to the pandemic crisis. That is the reason why virtual tourism is a crucial factor to regain this communication and open these borders in addition to the fact that potential tourism cannot be anticipated due to the lockdown and travel restrictions. (Akhtar, et al., 2021)

Sometimes there are obstacles for technology accessibility and involvement in the art of museums that could result due to the conventional way of thinking about IT convenience and technology aptness. One of the methods to adapt to the pandemic crisis is introducing variable cultural events such as operas, museums, tours, circus, and libraries for free. Some of these events could be appropriate only on-site as it will be a degraded cultural experience if presented online due to absence of the interactive feelings engaged with the unique event. Human computation, art-history and humanities expertise could offer the cultural opportunity to be displayed at home especially for learning purposes and put the outlines for a customized online experience. Such methods can make the virtual environment more inclusive and potential remote visitors more welcomed. (Pisoni, et al., 2021)

UNESCO and the International Council of Museums expect that almost 13% of museums around the world would close forever because of the pandemic crisis. That would affect many tourist destinations in Asia, Africa and the Arab world especially those depending on donors and sponsors, which constitutes about 5% of museums. To solve such a problem, various cultural institutions have created their own online applications or cooperated with domains such as Google Arts & Culture to survive and save the cultural experiments. This crisis could have led to employment cut-off but some museums e.g. The Blanton Museum of Art in Austin, Texas, have managed to redeploy their staff in digital like jobs. This initiative could inspire other museums especially in limited resources countries where they have lack of proper internet networks to be more creative in facing the crisis. (Schild, 2020)

Psychological Impacts of Covid-19 and Virtual Tourism:

COVID-19 crisis triggered various physical and psychological problems all around the world such as tension, nervousness, sleeping problems, despair, bad behavior symptoms, and immunity malfunction. Furthermore, the world started to look after unusual methods to solve these symptoms of an unprecedented crisis such as stress management and relaxation practices. So, they thought of tourism as one of these techniques

that can help reducing that stress and achieving relaxation. Tourism is usually associated to nature and the eco-system, which are main sources for alleviating anxiety. On the other hand, during that lasting lockdown and the use of the slogan of “Stay Home” could lead to a retreat in that theory. Moreover, virtual and 360° tours can produce a similar feeling of the natural experience that we lack during the pandemic by imitating the senses of visions and sounds., Consequently “enjoyment, involvement, and satisfaction” resulting from this tourism experience can diminish tourists' tension instigated by the COVID-19 crisis. (Yang, 2021)

Social Impacts of Covid-19 and Virtual Tourism:

It is worth noting that this is an extraordinary social situation where tourism movement was stopped or declined generating a disconnection between destinations' heritage and both citizens and tourists. It is difficult to provide a socially interactive and safe tourism experience at the same time. Tourist guidance is an example of services that were provided in a physical environment by actual guides that had to be transformed to online activity. They can continue to do their role during the pandemic if they are more creative, reachable, and sustainable by gathering more audience. They have to try to be more intimate and friendly to their virtual tourists to compensate them for non-physical contact by trying to be more impressive, communicating, adaptive, and incomparable. In order to adapt to the closure imposed by the pandemic crisis, almost 70-80% of the European museums expanded their virtual reality activities and started to improve their human resources digital capabilities. Consequently, there is an enhanced awareness among destinations that the use of virtual reality will not affect the tourists need to visit heritage attractions and that tourism industry will still be the incentive for the local economy in countries with cultural heritage. (Viñals, et al., 2021) There are some problems that could lead to the society's rejection of the digital transformation such as the technological separation, digital susceptibility, and lack of confidentiality, deception and absence of digital code of ethics. (Ulrike, et al., 2020)

Economic Impacts of Covid-19 and Virtual Tourism:

The coronavirus crisis impact continues to have serious economic repercussions on tourism, leading tourists lack for cash, incapable to pay for the regular global tours of pre-crisis times. Consequently, tourists' budgets might decline and the requirements to travel will decrease because of the movement restrictions and lockdown. Subsequently, several tourists will search for more accessible and budget-friendly destinations enhancing local economies. Travel agencies developed innovative technological techniques to confront social distancing restrictions. Online tours, video conferences and virtual museums have been globally accepted as remarkable models and solutions to the current economic crisis and into the post-crisis world. (Lipchik, 2020)

Role of Virtual Museums in Facing the Crisis:

Unlike previous crises that hit tourism during the last two decades such as: the September 11 terrorist attacks in 2001, (SARS) outbreak in 2003, and the global economic crisis in 2008/2009, the current crisis is a

turning point in history. Most of the previous crises proved that tourism is a resilient industry and could be part of the solution. The current one would lead to a longer-term decline as the recovery from COVID-19 is unexpected. To stop the spread of the disease, destinations started to take actions to stop the movement of people by taking measures such as lockdown, quarantine, and travel restrictions, which meant the stopping of tourism. Consequently, the tourism industry suffers from a huge decline between 2020 and 2023, significantly confronting a decrease in the international demand. The only way to face such a crisis is to adopt some technological trends that suit the consumer behavior shifts resulted from the pandemic such as: “Voice Search & Voice Control, Contactless Payments, Robots in Hotels & Restaurants, Virtual Reality, Mobile Check-In, Recognition Technology, Artificial Intelligence, Internet of Things, Augmented Reality, Cyber security, Big Data”. (Ivasciuc, 2020)

Virtual Museums play an important role in the restart of tourism activities all around the world by inventing new tourism types and offering many prospects for various styles in tourism field. This will enable tourists to discover new destinations and sightseeing during the lockdown and encourage museums and other tourist activities to continue committed with their loyal visitors and solve the problem of unemployment that could result out of the crisis especially among tourist guides. (El-Said & Aziz, 2021)

Considering this epidemic, there are early indicators that IT has been extensively utilized, designed, and created to tackle several the challenges in our everyday life, involving business, tourism, and holidays. IT seems to be extremely efficient and vital in facing COVID-19 troubles i.e., tourist diagnosis and follow-up, virtual tours, and museums, etc. (Ulrike, et al., 2020) Digitalization of tourism is the solution for the recent and current struggle that destinations are going through due to COVID-19 crisis. These destinations have imposed travel restrictions to control tourist movement. It is important to discuss if digitalization could replace traditional tourism to overcome COVID-19 impacts. (Akhtar, et al., 2021)

Workers in cultural sector including heritage sites played a vital role in facing the crisis and became part of the solution by their talents and commitment to enhance the cultural awareness during the time of pandemic. They managed to guarantee the access to cultural events such as virtual museums, galleries, libraries, musicians, dancers, and visual performers and authors through digital programs, televisions, radio and the media despite lack of subsidies. Many governments will expand in using online technologies as a vital component of their strategic planning. This might seem threatening culture on the long term. However, the example of UAE’s universal online cultural economy will support cultural transformation into the digital world. It is essential to rejuvenate cultural conversation by tourism, for instance, as part of the solution to save culture as a mutual experience among civilizations. This crisis formulates a good opportunity to support cultural concepts such as democratic free, fair, and safe societies and develop an international contemplation on culture. Consequently, culture will be a vital part of the solution to the crisis by

creating a united resistance and making humanity stronger all together. (UNESCO, 2020) Virtual reality will be the solution to the pandemic crisis, as it will help destinations overcome the seclusion of COVID-19 lockdown. The crisis itself could be the vital factor for the improvement of evolving technologies and the present pandemic could be a trigger for the development and promotion of VR, a technology that has been undervalued and less used in the earlier period. (Ivasciuc, 2020)

Research Methodology:

The Present Study adopts the quantitative method based on e-survey to collect data from respondents in the UAE. The sample framework of the study is the population of UAE. The study used convenient sample to collect data due to effects of COVID-19. The survey was prepared in English and Arabic and was sent to respondents using emails and social media to reach a wide range of population. Data were collected between February and March 2021. Structural equation modeling was utilized to test research hypotheses. A total of 416 forms were collected from the UAE.

The questionnaire form included demographic data of respondents (gender, age and qualification). Seventeen statements were developed based on literature studies to measure the main four constructs of the research model using the five-point Likert scale (agree-disagree). Three statements were used to measure the importance of virtual museums; four statements were used to measure the role of virtual museums in enriching tourism experience; five statements were employed to measure the role of virtual museums in destination competitiveness; three statements were adapted to measure economic impacts of virtual museums; two statements were adapted to measure the role of virtual museums in crisis management. Data analyses were limited to respondents who travel regularly for tourism and those who travel internationally. Profile of respondents, mean values of respondents' perceptions, statistical differences among countries and gender using t-test, measurement models' validity and reliability are presented on table 1-3.

Findings

Table 1 Gender

		Frequency	Percent
Valid	Male	112	26.9
	Female	304	73.1
	Total	416	100.0

From Table No. (1), it is clear that the predominant percentage is females (73.1%) compared to 26.9% for males.

Table 2 Nationality

		Frequency	Percent
Valid	Local	380	91.3
	Resident	36	8.7
	Total	416	100.0

Table No. (2) Shows that 91.3% of the study sample was among the citizens of the United Arab Emirates compared to 8.7% of its residents.

Table 3 Qualification

		Frequency	Percent
Valid	Secondary	116	27.9
	University	274	65.9
	Postgraduate	26	6.3
	Total	416	100.0

The sample included a variety of qualifications, including 65.9% of university students, 27.9% as secondary schools' students, while the percentage of those who are postgraduates is 6.3%.

Table 4 Descriptive Statistics

	N	Mean	Std. Deviation
Interest in virtual museums Increases for scientific and educational purposes	416	4.00	.983
Virtual museums save in the time and effort of the tourist to allow him to enjoy other alternative attractions that were not available to him in the usual programs	416	3.98	.955
Virtual museums save in the budget of the tourist to allow him to visit additional attractions	416	3.94	1.003
Valid N (listwise)	416		

It is clear that respondents 'agree' with importance of virtual museums where the mean values are 4 for Interest in virtual museums Increases for scientific and educational purposes, 3.98 for Virtual museums save in the time and effort of the tourist to allow him to enjoy other alternative attractions that were not available to him in the usual programs, and 3.94 for Virtual museums save in the budget of the tourist to allow him to visit additional attractions.

Table 5 Descriptive Statistics

	N	Mean	Std. Deviation
Virtual museums help increase the demand for museums in general	416	3.89	.978
Simulating ancient events improves the tourism experience	416	3.99	.938
The use of 3D glasses adds more enjoyment to the tourism program	416	4.02	1.008
Presentation methods in virtual museums help to increase creativity and innovation	416	4.08	.976
Valid N (listwise)	416		

It is clear that respondents 'agree' with the role of virtual museums in Enriching tourism experience where the mean values are 4.08 for Presentation methods in virtual museums help to increase creativity and innovation, 4.02 for the use of 3D glasses adds more enjoyment to the tourism program, and 3.99 for Simulating ancient events improves the

tourism experience and 3.89 for Virtual museums help increase the demand for museums in general.

Table 6 Descriptive Statistics

	N	Mean	Std. Deviation
The tourist is attracted to the virtual museums whenever they are innovative and exciting for him	416	4.06	.970
The simulation in the museum display contributes to the further attraction of the tourist destination	416	4.04	.855
Virtual museums contribute to reducing the prices of tourism programs, which increases the demand for the tourist destination	416	3.95	.928
The virtual museum helps diversify innovative tourism products and services and distinguish the identity of the tourist destination	416	4.01	.922
The virtual museum helps to increase the loyalty of tourists to the tourist destination	416	3.93	.953
Valid N (listwise)	416		

It is clear that respondents ‘agree’ with role of virtual museums in Destination Competitiveness where the mean values are 4.06 for The tourist is attracted to the virtual museums whenever they are innovative and exciting for him, 4.04 for The simulation in the museum display contributes to the further attraction of the tourist destination, and 4.01 for The virtual museum helps diversify innovative tourism products and services and distinguish the identity of the tourist destination, and 3.95 for Virtual museums contribute to reducing the prices of tourism programs, which increases the demand for the tourist destination, and 3.93 for The virtual museum helps to increase the loyalty of tourists to the tourist destination.

Table 7 Descriptive Statistics

	N	Mean	Std. Deviation
The virtual museum is a source of income for the tourist destination	416	3.90	.933
The virtual museum increases the chances of attracting tourist expenditure during the tour	416	3.91	.931
Virtual museum display methods increase the attraction of tourism investments to the destination	416	3.95	.949
Valid N (listwise)	416		

It is clear that respondents ‘agree’ with economic impact of virtual museums where the mean values are 3.95 for Virtual museum display methods increase the attraction of tourism investments to the destination, 3.91 for The virtual museum increases the chances of attracting tourist

expenditure during the tour, and 3.90 for The virtual museum is a source of income for the tourist destination.

Table 8 Descriptive Statistics

	N	Mean	Std. Deviation
Virtual museums help increase the destination's market share	416	3.90	.962
Virtual museums contribute to avoiding crises in the tourist destination	416	3.93	.949
Valid N (listwise)	416		

It is clear that respondents ‘agree’ with role of virtual museums in crisis management where the mean values are 3.93 for Virtual museums contribute to avoiding crises in the tourist destination, 3.90 for The Virtual museums help increase the destination's market share.

Hypotheses testing

Table 9 Correlation and of Determination Coefficients

R	R Square
.910	.827

Table 9 shows a significant correlation between the variables of the study (R=0.910) and R square of 0.827 depicts that VM importance, enriching experience, destination competitiveness and economic return by VM affecting the tourism restart with a percent reaches 82.7% of the variance in tourism resume.

Table 10 Regression Significance using F test

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	295.272	4	73.818	492.723	.000
Residual	61.574	411	.150		
Total	356.846	415			

F test displays the value of F (492.7, p<.01) that is an evidence of the significant effect of the four independent variables on tourism return.

Table 11 Regression model

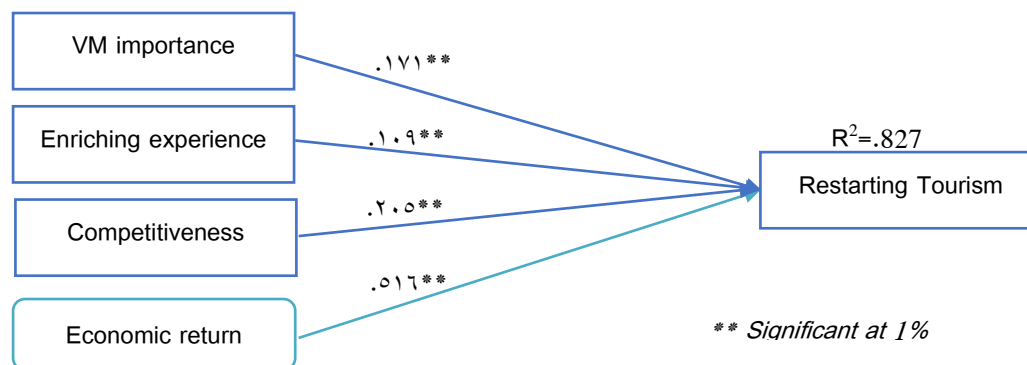
	B	Std. Error	T	Sig.
Constant	.77-	.110	-1.94	.049
VM importance	.171	.044	3.938	.000
Enriching experience	.109	.041	2.677	.008
Destination Competitiveness	.205	.065	3.150	.002
Economic return	.516	.054	9.576	.000

As for Table 11 and Figure 1, it is found that tourism return is significantly affected by:

- Economic return of VM ($\beta=0.516$ and $p<0.01$ and hypothesis 4 (H4) is supported).
- Destination Competitiveness ($\beta=0.205$ and $p<0.01$ and H3 is supported).
- Enriching experience ($\beta=0.109$ and $p<0.01$ and H2 is supported).

– VM importance ($\beta=0.171$ and $p<0.01$ and H1 is supported).

Figure 1. Testing research hypotheses



Conclusion:

In conclusions of this research and its analysis, the world is experiencing considerable change and progress. This pandemic resulted in the necessity to modify daily life involving movement, particularly throughout the social distancing precautions. Nevertheless, some of these consequences left positive implications as well. Many online services are replaceable especially with the technological developments that made virtual reality possible. An example of these digital services are virtual museums, while the most impressive and famous tool are virtual tours. This is a unique tourist service that to promote the culture of the society especially at the time of global lockdown while tourists are kept home.

This paper discussed the role of virtual museums in the United Arab Emirates. It explained the most important museums in the UAE and then the role of virtual museums under the circumstances related to the Corona virus crisis that affected the whole world. It tackled the importance of these virtual museums in UAE and stated the example of the initiative that targeted the UAE students’ segment in order to introduce them to their heritage. Then, the study moved on to identify models for virtual museums in various countries of the world, which had an experience similar to that of the Emirates, and we cited a number of examples with a brief explanation of the contents of each of these museums.

The study concluded that virtual museums have psychological, social, and economic impacts that need to be investigated. The role of virtual reality has been developed to include up to date activities such as space and drone tourism. Moreover, the study also assumed that virtual reality could be part of the solution to the current crisis as digitalization could replace traditional tourism by inventing new tourism types. It could introduce innovative activities to enhance the cultural awareness and support cultural concepts as art could be recognized in the digital age. The achievement of virtual museum has made monuments and sightseeing reachable despite the crisis.

At the end of the research, it becomes clear to us those modern technologies have an important and pivotal role in the development of the work of the tourist guide, as these technologies have a vital obligation in the

field of tourism guidance. They work to integrate actual reality with virtual reality.

Finally, the study concludes that Corona crisis had a positive side that prompted countries to think about innovative techniques to face the consequences of this crisis, including the creation of virtual museums, which was a pioneering idea to help restarting tourism.

Study Results:

- Virtual museums became so famous in UAE and the whole world;
- Virtual tours are an effective education tool used over the Internet to display some archaeological and tourist sites;
- Tour guides can benefit from many modern technologies that enable them to practice their profession;
- COVID-19 crisis could be an opportunity to change the traditional way of thinking of global museums;
- Tourism benefited from the crisis in establishing their cultural role and looking after their society's heritage;
- Cultural tourism is one of the types that would be promoted from virtual reality applications ;
- Space and Drone tourism are examples of virtual tourism
- Tourism is giving a fascinating experience of virtual tours that could be a suitable alternative at the time of crisis.
- Virtual tourism is still attracting tourists especially after the pandemic.
- Virtual reality will be the solution to the pandemic crisis, as it will help destinations overcome the seclusion of COVID-19 lockdown.
- Tourists can be attracted and integrated into such virtual museums ;
- It is possible that virtual museums reduce the economic wheel of the state;
- This type of museum will help people with special needs to visit the museum without any difficulty and around the clock.
- Virtual museums also assist in scientific and educational tourism as well as academic and artistic purposes.
- Tour guide should be able to use GPS techniques, altimeter, measuring devices, water depth measuring devices that will help in the fields of safari, mountain climbing, trekking, and desert camping tours.

Recommendations:

- Museums should invest funds more efficiently.
- Museums have a duty to enhance the level awareness and talents among their employees.
- Museums had better deploy the standard of benchmarking on international levels of competitiveness.
- Museums ought to increase the number of online staff during the pandemic.
- Museums have to collaborate with the society to overcome the social and psychological impacts of the crisis through:
 - a) Creating online groups congregated close to the museum,
 - b) Involve the surrounding community in selecting its holdings,

- c) Encourage the people to share their unique ideas,
- d) Boost society members to work as volunteers.
 - Virtual museums should accomplish super speed internet, well-managed contents and professional support team.
 - Virtual museums is duty-bound to improve the opportunity of visiting the building both from the inside and outside in addition to creating 24/7 tours.
 - The virtual tour should be created in a way that gives the tourist the utmost feeling of independence and lack of restrictions as well as a high level of interaction.
 - Virtual museums should use all the available assets to create contents in various formulas.
 - Virtual museums have to provide accessible services especially for handicapped tourists and transliterate their show into sign and Braille languages.
 - Virtual museums and tours ought to promote culture and spread awareness.
 - Museums should shape the nation’s identity and work as an educative tool to the society.
 - The Virtual Museum should encourage tourists to be more integrated in their activities by being involved in seminars and brain storming sessions to discuss their strategies.
 - National museums should collaborate to give tourist the best possible experience.
 - The necessity of training and qualifying tourist guides in the use of modern technologies and artificial intelligence techniques and integrating them into the profession of tourist guidance is essential especially with recent crisis developments.
 - It is necessary to design smart websites and applications that based on simulating virtual reality so that they are used effectively and practically in both virtual museums and tours.
 - It is indispensable to increase the number of virtual museums that contain an integrated virtual electronic guide that contains all the information related to tourist attractions and archaeological sites.
 - It is important that virtual museums can support developing new tourists’ attractions by displaying the following:
 - a) Restoring ancient historical incidents and battles,
 - b) Recalling lives of famous historic
 - c) Visualizing lives of famous historic figures such as ancient kings and queens,
 - d) Imagining the way of life at certain periods of time and ages,
 - e) Renovating ancient Arts and architecture,
 - f) Reestablishing ruins of ancient buildings and temples.

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