

Venturing into Virtuality: Exploring the Evolution, Technological Underpinnings, and Forward Pathways of Virtual Tourism

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ABSTRACT: The research paper titled "Venturing into Virtuality" explores the emerging field of virtual tourism, examining its historical development, current consequences, and prospective future directions. The recent growth of virtual tourism can be ascribed to technological developments and world events that have imposed limitations on conventional travel, but the notion has existed for several decades. Initially functioning as a supplementary component to traditional tourism, the sector has since evolved into a well-established industry that provides a wide range of experiences. These experiences encompass immersive cultural explorations in major international urban centres and simulated alpine climbs. Virtual Reality (V.R.) and Augmented Reality (A.R.) are pivotal in driving this expansion. Virtual reality (V.R.) has facilitated the accessibility of experiences previously limited to a select few, owing to the availability of cost-effective headsets. On the other hand, augmented reality (A.R.) has been employed to augment real-world travel experiences through interactive overlays. The potential of virtual tourism is promising, as evidenced by technological breakthroughs such as haptic feedback that enhance the immersive nature of experiences. One noteworthy development to monitor is the increasing integration of virtual and actual travel encounters. To maintain the authenticity and appeal of traditional tourism in the face of the growing prominence of the virtual dimension, it is crucial to adopt a balanced strategy that acknowledges the transformative potential of this emerging trend.

While debate continues about the best strategies for the VT management, particularly identifying the determinants of the demand for VT and the determinants for the satisfaction level for VT. This research aims to examine the correlation between academic level and the demand for VT and the correlation between satisfaction level and different forms of VT. Mixed research methodology (surveys and focus group interviews) using variance analysis (ANOVA) and T-tests were used to examine contextualized insights into demand and satisfaction levels for VT. The findings of the survey (n=95) and the focus group interviews indicated that the demand for VT tends to increase as the education level increases, and the satisfaction level for VT tends to increase as the form of VT changes from adventure to culture. The findings have practical implications for tourism-related businesses. A second approach using numerous case studies on VR was examined to ascertain the success and challenge factors. Findings from this case studies approach provided further support and relevance to multiple research findings. This study has limitations but provokes further investigation into the relationship between demand factors and determinants of the satisfaction level of VT.

KEYWORDS – Virtual Tourism, Augmented Reality, Chatbots, Drone Videography, Haptic Technology, Interactive Maps, Virtual Reality.

I. INTRODUCTION

Virtual tourism is utilizing digital technology to replicate travel experiences, enabling individuals to engage with destinations, monuments, or cultural places without needing actual presence. Digital exploration can be supported using a range of mediums, such as Virtual Reality (V.R.) headsets, applications utilizing Augmented Reality (A.R.), Videos with a 360-degree perspective, Interactive websites, and Live webcams. Virtual tourism presents a distinctive amalgamation of ease and accessibility, surpassing conventional limitations of travel while perhaps lacking the tactile and immersive experiences associated with physical exploration—the rise and relevance of virtual tourism in the current global context (Voronkova, 2018). There are new ways to experience the world around us thanks to the rapid technological improvements and shifting consumer interests that

characterize the digital age. Within this digital revolution, virtual tourism is an emerging phenomenon that has the potential to disrupt the travel and tourism sector completely. This study's primary goal is to closely examine virtual tourism, comprehend its nuances, assess its effects, and project prospects within the tourism industry. This study explores the development of virtual tourism, tracking its rise from simple web images to complex V.R. and A.R. experiences, all fueled by the development of more accessible V.R. equipment and better 360-degree cameras. This study also assesses user involvement, pinpoints key demographics and inclinations, and contrasts virtual and real-world travel experiences. With an emphasis on income creation and any challenges from substitutes, the economic aspect evaluates monetisation options and their effects on traditional tourism sectors (Verma et al., 2022). The potential of virtual tourism for sustainability and improved accessibility for individuals unable to travel conventionally is examined from environmental and social viewpoints. Some challenges are mentioned, such as concerns about authenticity and technological limits. Forecasting discusses upcoming technological developments and prospective hybrid travel arrangements. Lastly, the report provides consumers and businesses with strategic recommendations to maximise the advantages of virtual travel (Godovykh et al., 2022). In the next section, we explore the evolution of Virtual Tourism (VT), technological advancements, and further work or "gaps in the research" carried out to date that requires extended investigation into venturing into virtuality (VT).

II. BACKGROUND AND LITERATURE REVIEW

The term "Virtual Tourism," which is commonly used interchangeably with "Digital Tourism" and "Virtual Reality" (V.R.) tourism, has received much attention in the last ten years. This trend closes the gap between actual presence and virtual exploration by enabling travellers to experience destinations without leaving the convenience of their homes (Polishchuk et al., 2023). This literature review examines the development of virtual tourism, the technological developments that aided its expansion, the benefits and drawbacks of virtual tourism, and highlights gaps in the study that has been done thus far.

III. EVOLUTION OF VIRTUAL TOURISM

Historically, virtual travel dates to the earliest forms of storytelling and art. Whenever someone read about an exotic place or saw it in a painting, they travelled vicariously. Film and television introduced a more visual representation of places to audiences worldwide. However, virtual tourism in its current context began with the digital revolution. In the late 1990s and early 2000s, there was a massive increase in interactive websites. Some offered panoramic 360-degree views that made the place feel more real from the user's computer screen. The early 2000s saw a rise in virtual tours of museums and historic places, often facilitated by panoramic photographs. With the evolution of 360-degree video and more sophisticated V.R., complete immersion into distant places became feasible, transforming the tourism landscape (Tavakoli & Wijesinghe, 2019). Things in the travel and tourist industry are constantly changing, adapting, and morphing to keep up with new technologies and shifting global conditions. Virtual travel has been a big part of this change over the past few years. Its roots can be found in the early days of the Internet when simple websites showed pictures and descriptions of different places to visit. Still, this was a long way from the fully immersive virtual tourism adventures that would come later. As of that point, these digital events were limited, but they paved the way for what was to come.

Technological Advancements Facilitating Growth of Virtual Tourism: Technology development has indisputably served as the foundation for the contemporary phenomena of virtual tourism. Global expansion and widespread internet adoption contribute to this phenomenon (Palmer & McCole, 2000). The internet, due to its widespread accessibility, has not only facilitated the democratisation of knowledge but has also played a fundamental role in establishing virtual tourism. Broadband, characterised by its high-speed connections, served as the fundamental infrastructure for this extensive network, bringing about a revolutionary transformation in material consumption. This event marked a significant turning point in virtual tourism, as broadband facilitated the smooth transmission of visually immersive content with high resolution from remote locations worldwide.

Consequently, users could virtually experience and explore unfamiliar places, surpassing the constraints imposed by geographical boundaries. Expanding upon the aforementioned digital foundation, the emergence of 360-degree cameras garnered significant attention and recognition (Wang et al., 2002). The cameras represented more than a mere technological progression; they fundamentally altered how virtual travel narratives were constructed. According to Guttentag (2010), incorporating comprehensive and detailed representations of various locations provides an unrivalled and all-encompassing perspective, effectively recreating the immersive experience of physically being present in a given area (Palmer & McCole, 2000). This departure from conventional photography and videography forms expands visual documentation possibilities. The advancements

in virtual tourism were significantly enhanced by the introduction of Virtual Reality (V.R.). The emergence of groundbreaking virtual reality headsets like the Oculus Rift, HTC Vive, and PlayStation V.R. has gradually dissolved the distinction between the virtual and physical realms. According to Wang et al. (2002), these devices provide users with finely designed digital environments beyond visual stimulation. They offer a whole sensory experience replicating the sensation of being physically present in a fictitious area.

However, it is essential to acknowledge Augmented Reality (A.R.) as an integral component of the technological landscape of virtual tourism. Augmented reality (A.R.) is a technology that distinguishes itself from virtual reality (V.R.) by seamlessly integrating digital elements into our physical environment. The potential of augmented reality (A.R.) in enhancing local tourism experiences was inadvertently highlighted by popular applications such as Pokemon Go (Genç, 2017). These applications, primarily designed for entertainment purposes, demonstrated the ability of A.R. to amplify and enhance real-world tourism experiences by seamlessly integrating virtual elements with the physical environment (Genç, 2017). Collectively, these technical advancements have not only enabled but significantly propelled the field of virtual tourism into an era characterised by remarkable expansion and untapped possibilities. Together, these technological marvels have made virtual tourism easier and launched it into a time of growth and promise that has never been seen before (Nayyar et al., 2018).

Benefits of Virtual Tourism: Virtual tourism has brought many benefits to the table that traditional travel has only partly addressed. This has changed the very nature of tourism. One of the best things about sustainability is that it shows the way to positive change. The world is dealing with climate change and the adverse effects of too much tourism. Virtual tourism offers an eco-friendly option that promises a much smaller carbon footprint. Traditional tourism uses many resources for travel, lodging, and other activities. Virtual escapades, on the other hand, only need an internet link and a device that works with them. This cuts glasshouse gas emissions by a significant amount (Buhalis et al., 2019). This environmentally friendly option is significant when the earth's fragile ecosystems are stressed. Virtual tourism also has the admirable benefit of preserving the natural and man-made legacy of our planet. Human exploration has largely impacted many delicate ecosystems. Even with regard to the wonders of nature or history, every step unintentionally adds to the wear and tear. It is possible to preserve these sites' durability and sanctity through virtual tourism. Future generations will be able to enjoy these places in their unspoilt state because virtual visits guarantee that they stay unaltered. Buhalis et al. (2019) emphasised how historical murals and endangered cultural monuments can be fully appreciated virtually and historically without posing a risk to human health, thanks to high-resolution photography and virtual reality technologies.

On top of these environmental and preservation benefits, virtual travel also has much untapped educational potential. Today's educational system focuses on hands-on learning, where students are passive receivers of information and actively involved in learning. This change in the way we teach goes well with virtual travel. They could "trek" through the Himalayas in a geography class without leaving the classroom. Virtual tours can be used by schools, colleges, and other educational institutions to create a more engaging and rich learning experience that turns abstract ideas into real-life examples (Neuhofer et al., 2012).

Additionally, virtual tourism is a promising prospect for individuals limited by various factors such as physical disabilities, financial limitations, or other limits. For individuals who are elderly, have disabilities, or face financial constraints, the aspiration to engage in worldwide travel frequently stays unrealised. Virtual tourism facilitates the democratisation of exploration experience, enabling individuals to go on global trips with just a simple click. Whether it is the attraction of Parisian streets, the secrets of Egyptian pyramids, or the tranquillity of Bali beaches, these experiences become widely accessible, unbound by traditional restrictions (Li, Wang, Liang, & Huang, 2020). The benefits of virtual tourism are not just an addition to regular tourism; they represent a significant change. As technology improves and modern needs come together, it promises to be sustainable, protect, educate, and include everyone. As the digital age goes on, the many benefits of virtual tourism will likely significantly impact how people journey and explore.

Drawbacks Based on Previous Research and Studies: Virtual tourism has grown quickly, and its alluring digital landscapes and easy access make it a tempting option for real travel. However, some apparent flaws under this shiny surface require a fair and critical assessment. The vague idea of validity is one of the most severe complaints. No matter how carefully it is made, the world of images and virtuality cannot fully replicate the full range of sensory experiences that travelling in the real world gives you. Research backs up the view that virtual experiences are like real travel in some ways, but not in the same way. They say there is a big difference between

real travel and its digital counterpart (Zhang & Hacikara, 2023). Adding to this conversation are the economic effects of virtual tourism. In many places worldwide, tourism is more than just a business; it keeps their economies going. Tourists bring a lot of money to these places, from beautiful islands to historic cities, whether through hospitality, local crafts, food, or guided trips. It would be very bad for these places' economies if virtual tourism, which is convenient, started to become more popular than real travel. Businesses that have been around for generations and are an essential part of the culture and community could see their sales drop and, in the worst cases, must close. Neuhofer and Ladkin (2017) talk about this possible danger and stress how important it is to understand how traditional tourism helps the economy and ensure that virtual options do not accidentally stop this source of income. The problems with virtual travel are not just in the economic or experiential areas. The technology needed to receive high-quality virtual experiences is a significant cause for concern. These do not just require an internet link; they also need high-tech gear like VR headsets and powerful computers. Such hardware, which is the pinnacle of immersive virtual travel, is costly, making it out of reach for a large portion of the world's population. This leads to a paradoxical situation where an industry that claims to be open to everyone mainly serves a wealthy elite, thereby maintaining a digital gap (Guttentag, 2010).

Furthermore, intertwined within these technical obstacles are health considerations that become prominent with the extended utilisation of virtual reality. When individuals interact with digital surroundings, their sensory systems, particularly vision, are exposed to situations that frequently diverge significantly from those seen in natural settings. Prolonged exposure to the screens of virtual reality (VR) headsets, which are situated close to the user's eyes, along with the simulated motion and depth perception, can result in various physiological discomforts. A variety of symptoms, including but not limited to eye strain and dizziness, are observed in many users. Some individuals may even have more severe symptoms, such as motion sickness. The health issues raised by research conducted Zhang et al. (2022) raise doubts about the sustainable nature of prolonged virtual excursions and the overall well-being of individuals engaging in such activities.

In this literature review of the evolution of VT, technological advancements have been deliberated, including VT drawbacks and advantages. The literature review indicated several gaps that require further research. A significant area in the research has not examined the determinants of the demand for VT and the satisfaction level for VT. Therefore, this research intends to examine the correlation between academic level and the demand for VT and, secondly, to examine the correlation between satisfaction level and different forms of VT. In pursuing these research findings, a concerted approach to this emerging domain requires prudence and acknowledgment of its constraints and complex obstacles. The following section will examine the appropriate methodology and rationale for the type of investigation, including the case study perspectives of success and challenges.

IV. METHODOLOGY

The research approaches that were utilised to acquire insights into the intricacies of virtual tourism are outlined in the Methodology. It considers the methods of data collection, the many approaches to data analysis, and the thought process of choosing these approaches. This endeavour aims to ensure that the findings are accurate and valid and provide a thorough grasp of the topic.

Research Questions and Hypotheses: The primary aim of this research objective is to develop a model of how the demand for VT changes with the change in academic level and how the satisfaction level for VT changes with change in the form of VT. This study has framed the following core contributory research questions to accomplish this aim:

How do its determinants impact the quest for VT? This question concentrates on the determinants of VT (demand and satisfaction). As many scholars have averred, It is the demand for a particular product that determines the marketability of that product. Thus, the narrow focus of this research is on two closely related components of demand for VT: its determinants and satisfaction levels. The guiding questions are as follows:

1. **How do its determinants impact the demand for VT?** This question determines how the demand for VT is determined by its determinants.
2. **How do the forms of VT impact the satisfaction level for VT?** This question looks at what form of VT increases the satisfaction level for VT.

This question is answered through the testing of the following hypotheses.

Hypothesis 1 (H1): The demand for VT increases as the academic level elevates.

Hypothesis 2 (H2): VT satisfaction level tends to increase as the engagement shifts from adventure to cultural.

The above questions aim to develop a comprehensive framework model to understand the determinants of the demand for VT. The research findings will establish a foundation to understand VT and the demand for VT better.

Research Design: In this study on virtual tourism, a mixed-methods technique was used as the primary research strategy. This uses both quantitative and qualitative research methodologies, capitalising on the advantages offered by both to present an all-encompassing perspective of the topic. Quantitative research provides evidence in the form of statistics, enabling the results to be generalised. The primary contribution it makes is to a better understanding of the scope of virtual tourism. On the other hand, qualitative research looks deeper into individuals' experiences, perspectives, and motives. As a result, it provides a more in-depth and nuanced understanding of the subject matter.

V. DATA COLLECTION METHODS

Quantitative Data Collection

➤ **Surveys:** An online survey was designed and distributed to a random sample of 95 individuals who have engaged in virtual tourism in the past year. The survey comprised closed-ended questions, capturing demographic details, frequency of virtual tourism engagement, preferred platforms, and overall satisfaction levels.

Qualitative Data Collection

- **Interviews:** Twenty respondents to the survey who had completed it were the subjects of semi-structured interviews. These interviews were approximately thirty minutes, during which the participants discussed their experiences, viewpoints, and driving forces concerning virtual tourism.
- **Focus Groups:** Two sessions of six to eight people each were scheduled for focus groups. These meetings aimed to start a conversation on the benefits and drawbacks of virtual tourism, technological obstacles, and the perceived worth of these experiences concerning traditional travel.
- **Case Study:** The technique for using case studies serves essential functions. Ten (10) case studies about VT were selected to offer a profound grasp of many contributing elements and permit a complete examination of a topic within its real-life context. They are useful for qualitative research since they make it easier to examine numerous variables. Case studies are particularly helpful in specialized or uncommon situations when there may be a lack of available research.

Data Analysis Methods

Quantitative Data Analysis: The survey data was examined using SPSS (Statistical Package for the Social Sciences). The primary characteristics of the dataset were summed up using descriptive statistics (mean, median, and mode). ANOVAs and t-tests, two inferential statistics examples, were used to extract meaning from the data and spot trends or variations between groupings.

n=95 respondents

Descriptive Statistics (from SPSS)

- a. The median age group engaged in virtual tourism is between 25-34.
- b. The mode for gender is "Male."
- c. Most respondents hail from Australia.
- d. The most frequent educational background is a bachelor's degree.

Sections 2 & 3: Virtual Tourism Engagement and Satisfaction/ Preferences

- a. Median frequency of engagement: 4-6 times/year.
- b. Mode for virtual tourism experience: Cultural city tours.
- c. Most used platform: Google Earth V.R.
- d. Mean satisfaction level: 4.1 out of 5.

Analysis of Variance (ANOVA) results (from SPSS)

- a. Education level had a significant effect on the frequency of virtual tourism engagement.
- b. Those with Master's degrees reported engaging more often compared to other groups.

T-Test results (from SPSS)

- a. There was a significant difference in the satisfaction levels between those who engaged in virtual cultural city tours (mean = 4.3) and
- b. those who participated in virtual adventure experiences (mean = 3.8).

Conclusions drawn from the Data Analysis

- Based on this sample, the core demographic for virtual tourism is individuals aged 25-34, which makes up a sizable portion of the respondents.
- Cultural city tours are the primary choice for virtual tourism among these respondents.
- Google Earth V.R. is the predominant platform, reinforcing its significance in delivering quality virtual experiences.
- A notable trend is that those with higher education, particularly those with Master's degrees, engage more frequently in virtual tourism.
- Satisfaction levels vary based on the type of virtual experience, with cultural city tours receiving slightly higher satisfaction ratings than adventure experiences.

Qualitative Data Analysis

The focus group and interview qualitative data were thematically analysed after being transcribed. This comprised:

- a. **Familiarisation:** The researchers engaged in a comprehensive process of listening to audio recordings, carefully reviewing transcripts on several occasions, and making detailed observations to establish a profound familiarity with the material.

Initial Impressions:

- Participants have mixed feelings about virtual tourism.
- Technological challenges are a recurring theme.
- Many see virtual tourism as complementary to traditional travel rather than a replacement.

- b. **Coding:** The transcripts were methodically coded using a coding framework to find recurring trends.

- "Benefits of virtual tourism"
- "Limitations of virtual tourism"
- "Technological challenges"
- "Virtual vs. traditional travel."
- "Future outlook of virtual tourism"
- "Sustainability concerns"
- "Cultural experiences"

Theme Identification: Broader themes were identified based on the recurrent patterns and codes.

- **Evolving Perceptions:** "Initially, I saw virtual tourism as just a fun tech gimmick, but after the pandemic, I realised its potential as a real travel alternative."

- **Technological Pros and Cons:** "While VR offers immersive experiences, glitches or connectivity issues can quickly ruin the moment." "I was amazed at how AR could superimpose historical data on real-world monuments."

- **Complementary, Not a Replacement:** "For me, virtual tours are great for previewing or reliving experiences, but they cannot replace the feeling of actually being somewhere."

➤ **Future Potentials and Concerns:** "I see a future where I can virtually walk through a city with friends from different parts of the world.". "As much as I enjoy virtual tourism, I worry about data privacy and the environmental impact of powering massive data centres."

➤ **Sustainability and Responsible Travel:** "Virtual tourism could help places with too many visitors feel less crowded. It is a way to move that does not leave behind green waste. "It can be a tool for education about sustainable practises when you physically visit a place."

3.4.2.d. Interpretation: The topics were analysed by researchers within the broader framework of travel and technology.

➤ **Evolving Perceptions:** The changing global landscape, particularly the impact of the pandemic, has been essential in transforming the way virtual tourism is perceived, transitioning it from a mere novelty to a vital requirement for numerous individuals.

➤ **Technological Pros and Cons:** The quality of the user experience is crucial in technological industries, as is the case with any industry powered by technology. Ongoing progress is necessary to provide smooth and uninterrupted experiences.

➤ **Complementary, Not Substitutable:** Physical travel's tactile, sensory, and spontaneous aspects are irreplaceable. Nevertheless, virtual tourism presents a distinct value throughout the journey planning and reminiscence phases.

➤ **Future Potentials and Concerns:** The potential for shared virtual experiences is considerable, yet stakeholders must address problems about data privacy and environmental sustainability.

➤ **Sustainability and Responsible Travel:** Virtual tourism is a distinctive approach to reconciling the worldwide need for travel with the imperative of sustainability. This versatile resource can function as both a pedagogical instrument and a sustainable alternative for travel with minimal environmental impact.

3.5. Rationale for the chosen Methodology

The mixed-methods approach's justification is rooted in the complexity of virtual tourism.

Quantitative Data: Empirical information is necessary to assess the prevalence and appeal of virtual tourism, given that it is an emerging area. The quantitative data helps identify any patterns or trends related to the level of involvement and its scale.

Qualitative Data: An in-depth examination of individual narratives is necessary due to the subjective character of tourism encounters, both virtual and physical. The qualitative method offers insights into motives, perceived value, and individual experiences while capturing the complexity and diversity of these narratives. Moreover, using both strategies counteracts the drawbacks of using only one. Qualitative data provides that depth, whereas quantitative data may not. On the other hand, quantitative data allays the criticism that qualitative data cannot be generalised.

Case Study: Case studies are rationally chosen when research topics require thoroughly examining a particular instance or event. They offer helpful, real-world examples supported by a wealth of qualitative data sources. Case studies assist in establishing causal linkages in particular circumstances and provide light on complicated issues. They also assist in implementing theoretical frameworks by acting as illuminating examples. Numerous case studies can also align with the research questions, enabling rigorous exploration and providing practical, context-specific insights. This approach contributes valuable knowledge to the academic community and beyond.

VI. RESULTS AND DISCUSSIONS

Demographic Results

1. Age:
 - a. Under 18= 3
 - b. 18-24= 15
 - c. 25-34= 38
 - d. 35-44= 23
 - e. 45-54= 12
 - f. 55-64= 3

g. 65 and above 1

2. Gender:

- a. Male= 45
- b. Female= 44
- c. Non-binary/Third gender= 5
- d. Prefer not to say 1
- e. Other: 0

3. Location (Country/Region):

- Australia (45)
- New Zealand (25)
- U.K. (15)

4. Highest Level of Education:

- a. High School or equivalent = 20
- b. Vocational/Trade School 8
- c. Bachelor's Degree= 40
- d. Master's Degree= 25
- e. Doctorate or higher= 2
- f. Other: 0

(N=95 respondents, yielding a response rate of 9.5 %)

Quantitative Results

VT Demand Hypothesis		
	t-value	Test Results
(H1 ₀): The demand for VT increases as the academic level elevates.	(t)>.05	Accept
(H1 _a): The demand for VT tends not to increase as the academic level elevates.		Reject
VT satisfaction level Hypothesis		
	t-value	Test Results
(H2 ₀): VT satisfaction level tends to increase as the engagement shifts from adventure to cultural	(t)>.05	Accept
(H2 _a): VT satisfaction level tends not to increase as the engagement shifts from adventure to cultural		Reject

Table 1: Summary of hypotheses tests based on t-test (using mean values)

Individuals can now experience new locations without having to physically relocate because of the rise of virtual tourism at the intersection of technology and travel. Virtual tourism is taking advantage of the ongoing development of technical improvements to provide experiences that are more immersive, realistic, and interactive. The key technologies reshaping the landscape of virtual tourism are investigated in depth in this study.

The research findings shed light on various critical aspects of virtual tourism (VT). Firstly, it highlights that the demand for VT is significantly influenced by determinants such as technology adoption and education levels. Moreover, these factors also play a crucial role in shaping users' satisfaction levels with VT experiences. The qualitative findings add depth to this understanding by emphasizing that VT should be seen as a complementary enhancement to traditional travel rather than a complete replacement. This is particularly evident in the shifting perspectives towards virtual travel, the benefits and drawbacks of the technologies involved, and the pressing concerns surrounding data privacy and sustainability.

Furthermore, the study provides valuable insights into the demographic profile of individuals aged between 25 and 34, revealing them as a significant user group for VT, especially those adepts at using advanced VR tools like Google Earth V.R. The examination of Virtual Tourism Case Studies further underscores the potential for success within specific age groups, while also illuminating the anticipated technological challenges, as well as ethical and security considerations. In essence, the research underscores that the advantages of VT outweigh its limitations, which primarily revolve around technical hiccups, privacy concerns, and environmental impacts. The research findings envision a promising future for VT, with potential growth trajectories ranging from shared virtual experiences to integrating augmented reality solutions. However, stakeholders must prioritize active engagement with VT to realize its full potential. Specifically, future research endeavours should delve deeper into the determinants driving the demand for VT and the factors influencing user satisfaction, particularly as new technologies and application tools continue to evolve, offering increasingly immersive real-world and real-time tourism experiences.

In the next section, the paper explores new technologies in VT and critical concepts to examine their applications to leverage the demand determinants and potential satisfaction of users venturing into virtuality.

VII. KEY CONCEPTS AND TECHNOLOGIES IN VIRTUAL TOURISM

The exhaustive quantitative and qualitative studies have demonstrated that virtual tourism is at the intersection of forward-thinking technology and the innate desire of humans to discover new things. The demographic of people aged 25 to 34, who prefer digital experiences, particularly cultural city tours, primarily accessed through Google Earth Virtual Reality, is at the centre of this booming industry. This demographic shift is interwoven with a background in education; individuals with master's degrees show more involvement frequency than those without master's degrees.

Nevertheless, this is not only about the numbers. The intricate terrain of opinions, expectations, and worries around virtual tourism is revealed by delving further into the domain of qualitative data. Virtual experiences, which were at first considered technological novelties, went through a significant shift during the epidemic age, and as a result, many people began to view them as genuine travel alternatives. It is impossible to deny the attraction of immersive experiences that may be had through V.R, yet the technology is not without difficulties. Technical hiccups and connectivity problems can quickly detract from the sensation of travelling virtually. Additionally, technological advances such as augmented reality (AR), which superimposes historical data on actual locations worldwide, allow insights into the sector's endless potential applications. It seems that complementarity, rather than substitution, is the overall attitude that people are feeling. Virtual tourism has carved out a space in a traveller's visit's planning and remembrance stages. This is even though physical travel's sensory and tactile fulfilment is still unmatched. As we look into the distance, the possibilities appear vast; for example, we may take shared virtual strolls across cities with friends in different parts of the world. However, worries about data privacy and the environmental toll that massive data centres wreak on the environment are inextricably linked to this promise.

The concept of sustainability emerges as perhaps the most crucial message, which is relevant in the present and the future. In the fight against over-tourism, virtual tourism is emerging as a potentially helpful ally because it provides a more environmentally friendly and waste-free form of exploration. More than just an experience, it has the potential to be a dynamic teaching tool that can make travellers more aware of sustainable practices even when they are on physical excursions. This can be accomplished using virtual reality. In its most basic form, virtual tourism takes advantage of cutting-edge technology and chimes with a more fundamental worldwide need for environmentally responsible and ethical travel.

V.R. (Virtual Reality) in Virtual Tourism: The concept of tourism originates in physically exploring various locations and has done so since the beginning of time. Despite this, the travel landscape is undergoing a significant upheaval as we enter the age of digital technology. The Virtual Reality (V.R.) industry is at the epicentre of this transformation. This essay sheds light on the significant impact that virtual reality (V.R.) has had in redefining the paradigms of tourism, shifting it from primarily being a physical activity to an immersive digital experience. Virtual reality (VR) has emerged as a transformative force altering and reinventing various industries, most notably tourism. Virtual reality (V.R.) is a technology that has its origins in the field of computer simulations. V.R. creates scenarios that replicate and occasionally improve the actual world by immersing users in painstakingly built digital terrains (Huang et al., 2015).

Virtual reality headsets are principally responsible for making it possible to experience this complex combination of reality and simulation. When users put on these gadgets, they are immediately transported into three-dimensional arenas, providing them with a sensory experience that replicates and, in some cases, even surpasses genuine physical immersion. The advent of virtual reality (V.R.) may be traced back to the 1960s with technologies such as Morton Heilig's Sensorama. However, the genuine explosion of virtual reality headsets into popular culture did not happen until the 2010s, when the market was swamped with improved headsets designed with the user in mind. This decade was significant for introducing virtual reality (V.R.) into various industries, most notably the tourist industry (Lo & Cheng, 2020). Virtual reality's most significant opportunity for the tourism industry is its unprecedented immersive experience. It breaks down the barriers between different parts of the world, making it possible for people to virtually travel to places like the calm beaches of the Maldives or the busy streets of Sydney without leaving their homes. This level of immersion ensures that users, even inside the world of digital technology, feel an authentic feeling of presence, as if they are genuinely visiting these far-off locations. This gives them the impression that they are there. In addition to its use for simple exploring, virtual reality (V.R.) is also a valuable technology for previewing, as it enables potential visitors to 'experience' locations before deciding whether to go there. By providing these 'tasters' in virtual reality, users can streamline the process of making travel decisions by gaining information about potential lodging options, local attractions, and the general atmosphere of the location. In addition, the capacity of virtual reality to democratise experiences cannot be emphasised. There are those people who do not have the resources, whether they be financial, physical, or temporal, to satisfy their desire to travel. Virtual reality (V.R.) bridges this gap, making even the most far-flung or lavish destinations available to a broader audience than ever (Beck et al., 2019). While many tourists from developed nations may have the resources to travel, VT does capture the imaginations of underdeveloped nations' tourist destinations. The research will focus on VR and its determinants for demand in the context of traditional tourists influenced by VR technologies.

From an economic perspective, the impact of VR technologies has resulted in the birth of hitherto unimaginable revenue prospects. Virtual reality may now be leveraged by a wide range of entities, from tourism boards to hotel chains, to monetise immersive experiences by offering premium digital tours or unique content. Additionally, virtual reality can act as a powerful marketing instrument. Because of its unprecedented immersion, it provides tourism stakeholders with a novel channel to market their services, amplifying the resonance and recall of their brands. Nevertheless, the interaction between V.R. and more conventional forms of travel is fraught with complications. There is a possibility that the attractiveness of virtual reality could dampen people's desire to travel in the actual world. On the other hand, the research that is now available allays these fears by indicating that high-fidelity virtual reality experiences often intensify the desire for tangible travel rather than replacing it (Epple, 2018). As virtual reality (V.R.) advances in technology, a greater emphasis is placed on improving the quality and degree of realism of virtual experiences. Specifically, this entails making the images more detailed, improving the spatial audio, and incorporating haptic feedback. Concurrently, as virtual reality moves closer to the mainstream, it is crucial to ensure that top-tier experiences can still be accessed. This requires striking a balance between quality and cost, providing premium experiences without charging prohibitively high prices for them. One last thing to consider is how long you will be using V.R. and what effects that could have on your body. Eye strain and nausea brought on by motion highlight how vitally important it is for virtual reality (V.R.) hardware and software to have an ergonomic and user-friendly design (Melo et al., 2022).

Virtual reality's trajectory in the tourism industry appears limitless when viewed through the lens of the future. As new technology boundaries are explored, virtual reality (V.R.) experiences have the potential to become increasingly more lifelike, including the senses of smell, touch, and taste (Kim & Fesenmaier, 2016). In addition, the combination of virtual reality (V.R.) and its near relative, augmented reality (A.R.), holds enormous potential. These hybrid experiences would seamlessly combine the elements of the actual world with those of the virtual world. In addition, developments in artificial intelligence have opened the door to the possibility of personalised virtual reality (V.R.) tours that can be tailored to an individual's preferences by drawing on their prior actions and current responses (Eusebio et al., 2021).

Key Concepts	Technologies	Applications
Immersion	Head-mounted displays (HMDs) like Oculus Rift, HTC Vive	Immersion refers to the user's sensation of being in a different environment. HMDs provide this experience by blocking out the natural world and presenting a virtual one, offering users a feeling of being 'inside' the virtual space.

Interactivity	Hand Controllers, VR Gloves, Tactile Feedback devices	Interactivity is the ability of users to engage with the virtual environment. With hand controllers or gloves, users can "touch," "grab," or "manipulate" virtual objects. Tactile feedback devices enhance this by providing physical sensations corresponding to virtual interactions.
360° Experience	360° Cameras, VR Video Playback	Instead of static views, 360° experiences allow users to look around in all directions, emulating the natural act of looking around in real-life scenarios. 360° cameras capture these panoramic scenes rendered in VR platforms.
Real-time Navigation	VR Motion Tracking Systems	This allows users to move within the virtual space. Advanced motion tracking systems detect users' physical movements, like walking or leaning, and translate them into the virtual environment for a more realistic experience.
Virtual Exploration	Photogrammetry, Laser Scanning	Photogrammetry and laser scanning enable real-world locations to be digitally mapped in high detail. Tourists can explore accurate recreations of actual destinations from the comfort of their homes.
Spatial Sound	Binaural and Spatial Audio Technologies	Sound plays a crucial role in immersion. Binaural and spatial audio technologies ensure that audio cues in VR align with visuals, giving a sense of direction and depth to sounds and enhancing the overall experience.
Augmented Virtuality	AR Overlays in VR, using tools like Microsoft's HoloLens	Augmented Virtuality integrates real-world elements, like video feeds, into the VR space. For instance, a virtual tour might overlay real-time information or interactive elements onto pre-recorded visuals.
Multi-user Experiences	VR Multiplayer Platforms & Servers	These allow multiple users to share a virtual space simultaneously, facilitating group tours or interactive sessions in a virtual tourism context.
Real-world Replication	3D Modeling Software, Terrain Generation tools	Accurate replications of real-world destinations are crucial for virtual tourism. Using 3D modelling and terrain tools, creators can craft detailed and true-to-life environments for virtual exploration.
Cultural & Historical Representation	Interactive Databases, Virtual Guides, AI Narration	It is not just about visuals. Virtual tourism can be enriched with cultural and historical insights. Interactive databases provide information, virtual guides offer narrated tours, and AI can adapt content based on user preferences.

The table highlights how virtual reality technologies are converging to produce experiences that are rich, interactive, and educational in the world of virtual tourism. Users can experience worldwide destinations without being limited by their physical location, and at the same time, they can be sure that the spirit and authenticity of the locations they visit are being preserved. In conclusion, whereas conventional travel emphasises hands-on discovery, the current technological zeitgeist, dominated by V.R., heralds an era in which virtual adventures compete and sometimes even outperform their counterparts in the real world. The barrier between the real and virtual worlds is becoming increasingly blurry, and virtual reality (V.R.) is at the centre of this transition. V.R. is changing tourism by offering the promise of boundless, immersive experiences.

Augmented Reality (A.R.) in Virtual Tourism: Augmented Reality (A.R.) is a pioneering technical marvel that seamlessly fuses the physical world with several layers of digital augmentation. The foundation of augmented reality is based on superimposing computer-generated sights, sounds, or sensations onto settings that exist in the actual world. The base of the natural world is not lost with Augmented Reality; it is somewhat embellished with digital additions, in contrast to its cousin, Virtual Reality, which transports people into a simulated world (Wei, 2019). A user's impression of their immediate surroundings can be improved by creating an interactive experience that balances actual and simulated elements. One may make the case that the origin of augmented reality can be traced back to the inherent desire of humans to improve their day-to-day experiences. The human race has always been interested in finding new ways to enhance reality, whether through cave paintings that appeared to come to life when lit by a flickering torchlight or Renaissance frescoes that gave the

impression of being three-dimensional. However, augmented reality (A.R.) as we know it today began its journey in earnest in the late 20th century. However, the technology's transformative promise was not fully realised until the 21st century, when powerful computing and mobile technology became widely available (Cranmer et al., 2020). The widespread availability of augmented reality (A.R.), thanks to innovations such as smartphones and smart glasses, has been a significant step towards democratising the technology. A.R. has been a game-changer in the context of applications that are used daily. Consider, for example, navigation apps that superimpose directional arrows over real-time camera feeds. This makes it straightforward for users to navigate. A.R. has also been implemented in the retail industry to provide virtual try-ons. This enables customers to understand better how various things, such as apparel or furniture, will function in their homes before purchasing. These applications highlight the usefulness of A.R. in bridging the gap between the natural world and the countless opportunities given by digital advancements (Han et al., 2013).

However, it is necessary to have a solid understanding that the power of A.R. does not solely rest in the visual aspect. The most well-known component of augmented reality (A.R.) is the superimposition of images; however, recent developments in spatial audio and haptic technologies have enlarged the purview of A.R. Users may now not only see but also hear and feel the augmented features, which allows for the creation of a multisensory experience that further blurs the barriers between the real and virtual worlds. This combination of the senses means that augmented reality (A.R.) experiences are more than just superficial visual additions; they resonate on a tactile and audible level, providing depth to the interactions they enable. Nevertheless, the road to augmented reality is not without obstacles, much like the journey of every disruptive technology. On the technological level, enabling the real-time display of high-resolution augmentations without latency continues to be challenging (Han et al., 2013). When it comes to the user experience, it is equally essential that the design of virtual elements and their incorporation into the overall experience feel natural and not jarring or out of place. The transition between the actual world and the augmented world must be seamless if people will accept augmented reality and incorporate it into their everyday lives. There is virtually no limit to the variety of directions that A.R.'s development could go in. It is possible to imagine a world in which augmented reality (A.R.) is woven into everyday life since the hardware and the software are becoming increasingly sophisticated. The possibilities are endless, whether realised through augmented reality contact lenses that deliver real-time information overlays or through augmented educational experiences that make learning more participatory. Additionally, the combination of augmented reality (A.R.) with other technologies, such as artificial intelligence, can result in augmentations that are even more personalised and aware of their surroundings (Cranmer et al., 2020).

Key Concepts	Technologies	Applications
Overlaying Information	AR Displays, Mobile AR Apps	AR enhances the real-world environment by superimposing digital information on it. For example, pointing your smartphone at a historic monument might display its history and significance.
Real-time Interaction	AR Hand & Finger Tracking, Touch AR	This concept allows users to engage directly with AR overlays. For instance, touching a virtual button in the air or on a screen might reveal more details about a tourist attraction.
3D Visualization	3D Holographic Displays, Mobile 3D AR Rendering	AR can project 3D holograms into the real world. This can be incredibly captivating in tourism, allowing, for instance, a reconstruction of a historical event in its actual location.
Location-based Services	GPS-enabled AR Apps, Beacon Technology	Many AR apps for tourism use the device's location to provide context-specific information. If you are near a museum, the app might automatically highlight its exhibits or hours of operation.
Enhanced Navigation	AR Wayfinding Apps	These apps can overlay directional arrows on the real world, intuitively guiding tourists to their destinations.
Interactive Storytelling	AR Narratives & Chronicles	Tourists can experience enriched stories with real-world locations embedded with virtual narratives, bringing historical or cultural events to life.
Real-world Object Recognition	Image & Object Recognition Algorithms	This tech identifies real-world objects essential for AR, allowing the AR system to provide relevant information or interactions, such as recognizing a statue and overlaying its historical context.
Collaborative Experiences	Multi-user AR Platforms	Allows multiple users to share an AR experience simultaneously, facilitating group interactions in a tourism context.
Real-time Language Translation	AR Translation Apps	Pointing an AR-enabled device at the foreign text, like a street sign or menu, can instantly translate it, making travel more accessible.
Cultural &	AR Time Portals, Virtual AR	Some AR applications allow users to "look back in time," showing

Historical Immersion	Guides	how a location appeared decades or centuries ago. Virtual guides, perhaps as holographic figures, can offer information and anecdotes.
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The ability of augmented reality to improve the surroundings of the actual world with contextual digital content is its primary selling point in virtual tourism. Because the digital and physical worlds interact this way, tourists may have more immersive, instructive, and engaging travel experiences. Augmented reality can dramatically change how travellers interact with their environment. AR can improve navigation and provide in-depth history and culture explorations (Han et al., 2013). The above discussion on Augmented Reality is a monument to the confluence of the actual and virtual worlds. It paves the way for an era in which users are not merely passive consumers of digital content but active participants in a constantly improved and customised reality. Augmented reality (A.R.) has the potential to become more than simply a fad as technology continues to progress. It can reshape how people perceive and engage with the world around them by integrating many layers of digital interactivity into the fundamental aspects of typical encounters. A.R. is positioned to be at the forefront of this convergence, altering the contours of reality as we know it as the physical and digital worlds continue to converge (Wei, 2019).

5.3. 360-degree Videos and Interactive Platforms in Virtual Tourism: Alongside interactive platforms, 360-degree videos have grown to become one of the most intriguing technical breakthroughs in recent years. This development marks a substantial divergence from more conventional ways of taking in media. 360-degree films envelop the spectator in a visual sphere, giving them the freedom to look in any direction they like, in contrast to traditional videos, which only provide audiences with a single perspective from which to observe the action. It turns out that this degree of involvement is not just a creative gimmick but rather an instrument of profound immersion. It invites viewers to be active narrative players rather than passive bystanders (Rahimizhian et al., 2020). This technological marvel's workings are based on complex camera arrangements that simultaneously record video in all directions. These configurations typically consist of a spherical array of cameras that operate in unison to capture overlapping video. Specialised software creates a seamless panoramic video by stitching the resultant images together. These videos come to life when viewed on suitable platforms or devices, giving viewers the impression that they are actually "inside" the video. The experience is made more enjoyable by incorporating extra layers of participation, which are offered via interactive platforms. Users can easily adjust the viewing angle of 360-degree videos hosted on platforms like YouTube and Facebook by moving the video screen or tilting their device in the desired direction. Other examples of similar platforms are Vimeo and Twitch. Compatibility with virtual reality (V.R.) is built into more sophisticated systems. When used in conjunction with virtual reality headsets, 360-degree films provide an unequalled level of immersion by blurring the lines between the viewer's environment and the video content nearly completely (Argyriou et al., 2020).

Nevertheless, the appeal of 360-degree videos is not contingent on the specifics of how they were made or the complexities of how they were presented. Its fundamental purpose is to reimagine the mechanics of the storytelling process. The canvas has massively increased, which is great news for content providers like filmmakers, advertising, educators, and a whole host of other people. Because they are no longer restricted to a single frame, storytellers now have the freedom to imagine narratives that encompass viewers and live not just in front of them but all around them. This shift in paradigm entails several new obstacles and opportunities (Argyriou et al., 2020). While the old methods of steering viewer attention, such as through camera angles, lighting, or focal points, need to be reimaged, a vast playground exists to create more all-encompassing and holistic tales. The ramifications of utilising this technology are extensive and diverse. For example, 360-degree movies give prospective tourists a more genuine picture of destinations by allowing them to stand atop mountains, wander through bustling marketplaces, or relax on beaches. The real estate sector can benefit from interactive home tours because they let prospective buyers or tenants explore properties at their own pace, resulting in a more meaningful relationship with the area. Students can go on virtual field trips, investigate historical places, or delve into complicated biological ecosystems without ever leaving their classrooms' protection and convenience because of the widespread adoption of this technology in the educational sector (Rahimizhian et al., 2020).

Nevertheless, there are obstacles to overcome, as there are in every stage of technical development. A detailed grasp of spatial storytelling is required in addition to specialised technology in order to create 360-degree footage of a high enough quality. In addition, there is still a significant obstacle to overcome to guarantee that these videos will stream faultlessly and without interruptions, particularly on less powerful devices. Because these videos demand such a large amount of data, there are additional worries over storage space and the

efficiency of their transmission via the Internet (Kelling et al., 2017). When one looks out towards the horizon, it is plain to see that the trajectory of interactive platforms and 360-degree videos is upward. The applications of this technology will spread throughout even more industries as it continues to advance, thereby making the production and consumption of content of this kind more approachable and enriching. The possible entry points are virtually limitless, ranging from live performances and concerts to immersive journalism (Kelling et al., 2017).

Key Concepts	Technologies	Applications
Immersive Visualization	360-degree Cameras, VR Headsets	360-degree videos allow viewers to look in every direction, immersing them in a virtual environment and making them feel as if they are "present" in a particular tourist spot. This is incredibly impactful when viewed through VR headsets.
Interactivity	Interactive Video Platforms, Hotspot Interactions	Beyond passive viewing, some platforms allow users to interact with specific points (hotspots) within the video, leading to additional information, videos, or interactive experiences.
Virtual Tours	VR Tour Creation Software	Virtual tours use a combination of 360-degree images/videos, often stitched together, to provide a comprehensive view of a location. Users can virtually "walk through" different spots, exploring them at their own pace.
Spatial Sound	Binaural Audio, 3D Sound Systems	Spatial sound in 360-degree videos gives a sense of directionality to audio sources, enhancing immersion. For instance, if a user hears a waterfall to their right and turns in that direction, the video will show the waterfall.
High-Resolution Imagery	8K 360 Cameras, Advanced Rendering Software	High-definition imagery ensures that the virtual experience is as realistic and straightforward as possible, capturing the minutiae of the locations and enhancing the immersive feel.
Narrative Storytelling	Guided VR Tours, Voiceovers	Some virtual tours incorporate a narrative element, guiding viewers through a location and offering insights, histories, or stories that enhance the experience.
Real-time Streaming	Live 360 Streaming Platforms	Allows viewers to experience an event or location from a 360-degree perspective in real time. This can be especially popular for live events in tourist destinations.
Social Interactions	Multi-user VR Platforms, Avatar Representations	Some platforms allow multiple users to simultaneously share a 360-degree video experience, facilitating group interactions or shared experiences in a virtual tour.
Adaptive Content	AI-driven Personalization Algorithms	Advanced platforms can adapt the content based on user preferences or past interactions, offering a tailored virtual tour experience.
Augmented 360 Experiences	AR Overlays on 360 Videos	Combining 360-degree videos with AR elements, viewers might see interactive 3D models, information overlays, or other digital enhancements within the 360-degree space.

In virtual tourism, 360-degree videos and interactive platforms provide a happy medium between total immersion and complete control for the consumer. Even though they cannot replicate the complete range of sensorial experiences that come with actual travel, they offer an immersive visual experience that can take viewers to locations they may never have the opportunity to visit in person. These technologies are transforming the landscape of virtual tourism in various ways, including their usage as instructional tools, promotional platforms, and a means of exploration. Interactive platforms support 360-degree videos, redefining the core tenets of narrative and engagement and revolutionising how content is consumed. This is in addition to the fact that they are revolutionising how material is consumed. This technology offers experiences that are both expansive and deeply intimate, marking a new chapter in the annals of digital media. As the line between the viewer and the narrative grows increasingly porous, this technology promises expansive personal experiences (Grima et al., 2023).

Augmented Reality Tours and Interactive Maps: The tourist industry has been one of the most noticeable beneficiaries of augmented reality's (A.R.'s) rise from a novel technology to an indispensable tool revolutionising various industries. To be more specific, Augmented Reality tours and interactive maps reflect a confluence of the real and the virtual, and they are transforming the way travellers traverse and interact with their surroundings. Unlike traditional tours, which rely on guides or static signage to explicate historical facts or offer contextual information, augmented reality tours allow tourists to overlay digital information on the actual world using devices such as smartphones, tablets, or augmented reality glasses. Traditional tours rely on guides or static signage for historical facts or contextual information (Fino et al., 2013). The inherent power of augmented reality (A.R.) resides in improving the user's immediate surroundings by superimposing pertinent information, images, or animations on their device's screen. When tourists activate an augmented reality tour application, for instance, they can see reconstructions of the monument's original appearance on their screen with textual fragments or narrations explaining its history. This could happen when the tourist stands in front of an ancient ruin. This helps viewers better appreciate and comprehend the locations they see by bridging the time gap and providing a window into the past. With the introduction of augmented reality (A.R.), interactive maps have undergone a revolutionary change, evolving from simple two-dimensional representations of geography to dynamic interfaces that communicate with users in real-time. Once these maps are combined with A.R., they take their own life. Pointing a gadget towards a city street may cause navigation routes, historical information, and restaurant ratings to come to life. Integrating augmented reality (A.R.) technology with location-based services guarantees that users can always access contextually relevant information customised to their immediate requirements and surroundings (Fino et al., 2013).

However, the benefits of A.R. tours and interactive maps go beyond simple knowledge sharing. They are changing the fundamental mechanics of travel itself. These instruments make autonomy lacking in many traditional led trips possible. Now that they have more control over the pace and course of their exploration, visitors can go deeper into areas of interest and bypass parts that they feel unnecessary. Each trip is guaranteed to be distinctive and catered to the individual's interests and preferences, thanks to this personalised approach to tourism. These enhanced experiences also have implications for regional economies. Small companies, such as specialised museums, charming cafes, and artisanal workshops, might use augmented reality (A.R.) to showcase their offerings as more well-known tourist destinations frequently eclipse them. These businesses can draw customers by integrating themselves into interactive augmented reality maps or providing specialised A.R. tours, which democratises the travel industry (Tsai et al., 2017). Several obstacles are in the way of A.R.'s development in the travel industry. First, producing complex augmented reality content requires a profound grasp of user experience concepts and technological know-how. Coordinated interdisciplinary efforts are needed to provide real-time response, integrate digital and physical domains seamlessly, and create engaging narratives.

Moreover, there is the accessibility issue. Not every tourist has access to cutting-edge AR-ready technology, which could lead to a gap between those who can and cannot have these enhanced experiences. There is also the possibility of information overload. Ensuring people are not overwhelmed is essential because there is a possibility of overlaying enormous amounts of data on the actual world. However, augmented reality seems to have a bright future in the tourism industry. Due to advancements in wearable augmented reality technology, such as smart glasses, there may soon be a transition from portable gadgets to more immersive tools that provide hands-free involvement. In addition, as augmented reality (A.R.) becomes more intertwined with artificial intelligence (A.I.), future tours and maps may provide real-time translations, deeper personalisation, and even predictive predictions, further improving the user experience (Rodriguez, 2015).

Key Concepts	Technologies	Applications
Enhanced Reality	AR Glasses (e.g., Microsoft HoloLens, Magic Leap)	AR superimposes digital content in the real world. When used in tourism, it can provide supplementary information or visuals to real-world locations, enhancing the traveller's experience.
Interactive Exploration	AR Mobile Apps (e.g., Pokémon Go, Google ARCore, Apple ARKit)	Using mobile devices, travellers can explore a location and interact with augmented elements, discovering hidden stories or historical insights as they move.
Historical Reconstructions	3D AR Models, AR Animation	Imagine standing in front of ancient ruins and using AR to see what they looked like in their prime. Historical reconstructions

		offer educational insights into a location's past.
Navigation & Wayfinding	AR Interactive Maps, Location-based AR	Instead of just a 2D map, AR can provide 3D directions, highlighting routes or points of interest in the real world through a device's camera.
Information Overlays	Geolocation Data, Object Recognition	Pointing a device at a landmark can instantly provide overlay information, from historical facts to visitor reviews.
Gamified Experiences	AR Treasure Hunts, Challenges	Tourism can be combined with gamified AR experiences, encouraging visitors to explore more and engage with their surroundings in fun ways.
Social Sharing	AR Photo/Video Filters, Social Media Integration	Travellers can capture and share their AR experiences, adding filters or digital elements before sharing with friends or social media.
Customisation	User-specific Data, AI-driven Recommendations	AR tours can adapt based on user preferences, offering tailored experiences or highlighting attractions based on past interactions.
Safety & Accessibility	Real-time Translation, Accessibility Features in AR	AR can assist tourists by providing real-time translations of signs or spoken words. For those with disabilities, AR can offer alternative ways to experience a location.
Marketplace Integration	AR Shopping, Virtual Souvenirs	Imagine pointing an AR device at a restaurant and instantly viewing its menu, booking a table, or even virtually tasting a dish. AR can seamlessly integrate commerce into the touring experience.

Augmented reality tours and interactive maps revolutionise how tourists interact with their environment. These technologies give a multi-layered experience by bridging the gap between the digital and real worlds. This allows travellers to see beyond the immediate and explore history, culture and tastes deeper. The distinctions between the real and the virtual will become even more blurry as augmented reality technology continues to progress, which will lead to travel experiences that are even more immersive and satisfying. Augmented reality tours and interactive maps are at the vanguard of an innovative wave sweeping the tourism industry. They bridge the gap between the physical and the digital by enhancing investigations of the natural world with additional information, interactivity, and customisation. Augmented reality has the potential to construct experiences that are richer, more individualised, and more deeply engaging, even though the process of integrating A.R. into the global fabric of travel is still in its infancy. Because tourists are increasingly interested in having meaningful and educational interactions with the places they visit, augmented reality (A.R.) will undoubtedly play a crucial part in shaping the tourism industry's future environment (Boletsis & Chasanidou, 2018).

Haptic Technology in Virtual Tourism: Expanding opportunities available to more people is one of the significant outcomes of implementing haptics in virtual tourism. Navigating some landscapes and climates may be difficult or even impossible for many people for various reasons, including physical disability and other constraints. Regardless of their physical restrictions, any person will be able to "touch" and "feel" these locations thanks to the ability of haptic technology to recreate the subtle tactile characteristics of the surroundings in question. Imagine a person who has trouble moving about being able to experience the rocky surface of a mountain range or the splash of a waterfall without having to leave the convenience of their own home (Side Wei et al., 2014). Haptics also creates waves in the cultural and historical explorations that are part of virtual tourism, another area where it makes waves. An enhanced comprehension and appreciation of legacy can be gained by digitally visiting historical locations or museums and being able to "touch" artefacts or architecture, albeit within the confines of a digital environment. This tactile dimension could offer insights into material compositions, the complexities of craftsmanship, or the wear and tear of time, giving a multisensory educational experience that is entertaining and instructive for the learner (Mulcahy & Riedel, 2021).

However, incorporating haptic technology into virtual tourism has its share of difficulties. For instance, one must comprehensively grasp the materials, environmental conditions, and human physiological processes to generate convincing tactile input. Another technology is to recreate a petal's smoothness, the rock's abrasiveness, or the water's fluidity, which requires complex computer programs, expensive hardware, and precise calibration (Alyahya & McLean, 2021). In addition, haptic devices, particularly those that are more sophisticated, continue to be very expensive, which may serve as a barrier to the technology's wider adoption. The prospective

applications within virtual tourism are becoming even more exciting as the underlying technology advances. Consider the concept of gastronomic tourism: in the not-too-distant future, haptic gadgets, possibly in conjunction with technology that replicate taste and scent, could enable users to experience what it is like to eat delicacies from other cultures. In adventure tourism, it is possible to simulate the sensation of wind, rain, or adrenaline from a steep drop, multiplying the excitement element (Side Wei et al., 2014).

Key Concepts	Technologies	Applications
Tactile Feedback	Haptic Gloves (e.g., Manus VR, HaptX)	Haptic technology can simulate the sense of touch by applying forces or vibrations. In virtual tourism, this means travellers can "feel" virtual objects or textures, like the roughness of a statue or the splash of water.
Virtual Object Manipulation	Force Feedback Devices	This allows users to interact with virtual environments in a more immersive way. For example, they pull a virtual lever or pick up a digital artifact in a virtual museum.
Environmental Simulation	Vibrating Platforms, Haptic Suits	Experience the sensation of different environments: the rumble of a busy market street, the gentle sway of a boat, or even the wind from a mountaintop.
Navigation & Guidance	Wearable Haptic Devices (e.g., belts, wristbands)	Haptic feedback can guide travellers through virtual spaces, signalling directions with tactile cues, such as a nudge or pulse.
Enhanced Interactivity	Haptic Pens/Stylus	Tourists can engage in creative activities in virtual spaces, like virtual pottery or painting, and feel the interaction through haptic feedback.
Temperature Simulation	Thermal Haptic Devices	Experience the warmth of virtual sunlight or the chill of a simulated ice cave. This adds another layer to the immersion of a virtual environment.
Safety and Training	Emergency Feedback Systems	In virtual training scenarios, haptic feedback can alert users to dangers, like the sensation of heat from virtual fire.
Accessibility	Adaptive Haptic Systems	For those with visual impairments, haptic technology can translate visual data into tactile feedback, making virtual tourism more inclusive.
Realism & Immersion	Multi-modal Haptic Systems	Combining various haptic technologies can create an experience that closely mimics real-life interactions, increasing immersion in virtual tourism spaces.
Content Creation	Haptic Feedback Design Tools	Developers can create virtual tourism experiences tailored to haptic feedback, ensuring that tactile sensations are meaningful and enhance the overall experience.

Through technology, virtual tourism provides an experience that is more than just visual or auditory; it also engages the sense of touch. As this technology develops and becomes more sophisticated, the ability to recreate real-world tactile experiences in virtual worlds will continue to rise. This will result in an even more significant blurring of the barriers between the physical and digital domains in the context of travel and exploration (Alyahya & McLean, 2021).

In addition, integrating haptic feedback with other developing technologies, such as artificial intelligence, is expected to result in experiences that are even more tailored to the individual. Systems might modify the tactile input based on the user's choices, previous interactions, or even real-time physiological responses. This would allow virtual tours to be personalised to an unprecedented degree. Haptic technology is reviving virtual tourism thanks to the promise to provide a tactile immersion experience (Mulcahy & Riedel, 2021). It is a tribute to human creativity that haptic feedback exists as the lines between the virtual and the real continue to blur. It ensures that our digital realms reverberate with our eyes, ears, and physical skin and bones. Even though there are still obstacles to overcome, the trajectory of the future of haptic-augmented virtual tourism promises richer, deeper, and more inclusive explorations, which will redefine how we experience the world through our digital portals (Alyahya & McLean, 2021).

Drone Videography in Virtual Tourism: In virtual tourism, drone videography has emerged as a transformational force, ushering in an era in which travellers can experience destinations in ways that have never been possible before, from the birds-eye perspective. Before the development of drone technology, obtaining expansive overhead views of expansive landscapes, cityscapes, or intricate architectural marvels was a challenge that could only be accomplished by high-budget productions and required the use of helicopters or other heavy equipment. This bird's-eye perspective has been democratized by the proliferation of drones, which, thanks to their portability, low cost, and highly developed camera systems, have made it possible for anyone, anywhere, to create virtual tourism. The virtual tourist experience aims to provide viewers with an immersive experience of a location without the limitations of actual physical presence (Jiang & Lyu, 2022). This goal lies at the centre of the virtual tourism experience. Even though it is an efficient method, traditional videography is frequently constrained by the limits of ground-based perspectives.

On the other hand, drones can circumvent these terrestrial constraints with ease. They glide through dense urban jungles, showcasing the juxtaposition of historical landmarks against modern skyscrapers; they navigate through rugged terrains, providing close-ups of mountain peaks or the depths of canyons; and they soar above coastlines, offering panoramic views of the shimmering water meeting golden sands. They present perspectives that were once either impossible or prohibitively expensive to capture (Vujičić et al., 2022). In addition to this, the use of drone filming in virtual tourism brings a more interactive component to the experience of viewing the videos. It is not only about showing locations but also about presenting a story about those locations. Ground-based cameras cannot mimic the fluidity of movement that is possible with drones, in addition to their capacity to access areas that are difficult to access. For instance, drones may follow species in their natural habitats without disturbing them, providing viewers with insights into nature's pristine moments. It can also trace the passage of a river from its insignificant beginnings to its powerful merger with the ocean (Ilkhanizadeh et al., 2020).

However, incorporating drone videography into virtual tourism has its share of obstacles to overcome. Concerns have been made about invasions of privacy, threats to public safety, and the possibility of upsetting local populations or wildlife as drones become more widespread. The utilisation of drones responsibly and ethically is essential. In several nations, regulations have been introduced that stipulate where drones are allowed to fly, how high they can ascend, and what permissions are necessary. The developers of virtual tourism face an additional challenge in the form of a layer of complexity when negotiating the regulatory landscape in their pursuit of breathtaking aerial content (Ilkhanizadeh et al., 2020). Even though drone technology has improved rapidly, capturing stable film with a drone, particularly in demanding environments such as terrains or weather, needs a high level of expertise and frequently demands specialised equipment. In addition, drone videography is not limited to simply flying the drone; it requires cinematography, framing, lighting, and storytelling knowledge to ensure the final movie is aesthetically beautiful and emotive. Despite these obstacles, drone videography seems to have a bright future in virtual tourism. As the technology behind drones advances, we may anticipate more extended flight periods, improved camera systems, and even more intelligent capabilities such as autonomous pathfinding and obstacle avoidance. These are just some of the things we can look forward to. These developments, when combined with the rising capabilities of virtual reality, hint at a future in which video shot by drones will be able to be experienced in 360-degree panoramas, which will further deepen the level of immersion (Ritter, 2023).

Key Concepts	Technologies	Applications
Aerial Perspectives	Multi-rotor Drones (e.g., DJI Phantom, Mavic series)	Drones offer unique bird's-eye views of destinations, providing visuals that ground-level photography cannot capture, such as vast landscapes, sweeping ocean views, or intricate city layouts.
High-resolution Imaging	4K and 8K Camera Drones	The high-definition quality ensures that the captured imagery is crystal clear, allowing virtual tourists to appreciate the intricate details of a location.
Dynamic Footage	Gimbal Stabilizers	These provide stability to the drone's camera, ensuring smooth footage even when the drone is moving at high speeds or facing wind disturbances.
Interactive Panoramas	360° Camera Drones (e.g., Insta360 series for drones)	Drones equipped with 360° cameras allow for the creation of interactive panoramas where users can look in any direction, enhancing immersion.
Real-time	Live Streaming Capabilities	Virtual tourists can experience a location in real-time,

Streaming	(with 5G advancements)	observing events, sunsets, or natural occurrences as they happen.
Automated Flight Paths	Waypoint Navigation & GPS-guided flights	Allows consistent and repeatable flight paths, which can help capture specific scenes or sequences in virtual tours.
Safety and Regulations	Geo-fencing & No-fly Zone Features	Ensures drones operate within designated areas, respecting privacy and regulatory guidelines, especially in restricted or sensitive locations.
Extended Flight Times	High-capacity Drone Batteries	Longer flight times mean drones can capture extended sequences, cover larger areas, or shoot multiple takes without frequent recharging.
Night Videography	Drones with Low-light and Infrared Cameras	Allows capturing footage in low-light conditions or during nighttime, highlighting aspects like city lights or nocturnal wildlife.
Storytelling and Narration	Editing Software with Drone Footage Integration (e.g., Adobe Premiere Pro, Final Cut Pro)	Beyond capturing footage, drones contribute to the storytelling aspect of virtual tourism, enabling creators to piece together sequences that guide viewers through a narrative journey.

Using drone videography in virtual tourism completely changes the presentation of sites by providing spectacular aerial perspectives that are impossible to capture with ground-based cameras. Drones come with duties that must be adhered to regarding safety, privacy, and following local legislation. While they provide tremendous potential for generating fascinating virtual tours, these responsibilities must be adhered to. The employment of drone technology responsibly and imaginatively has the potential to bring the experience of virtual tourism to entirely new heights. In a nutshell, aerial videography captured by drones is reshaping the landscape of virtual tourism. It provides virtual travellers with a better and more in-depth understanding of locations by utilising aerial perspectives, dynamic narrative, and the capacity to expose our unique globe's hidden nooks and crannies. Even though the process of integrating drones into virtual tourism will be fraught with learning curves and problems, it will be a riveting chapter in the ongoing evolution of how we explore and experience the world from the comfort of our screens because of the vistas that will be unlocked and the stories that the drones will tell (Ilkhanizadeh et al., 2020).

A.I. and Chatbots in Virtual Tourism: A paradigm shift is about to occur in how tourists engage with and experience digital destinations due to the introduction of artificial intelligence (A.I.) and chatbots into the virtual tourism scene. The goal of virtual tourism is to imitate or augment real-world travel experiences. As a result, the role of artificial intelligence (A.I.) and chatbots is becoming increasingly important in improving personalisation, accessibility, and engagement. This helps to establish an atmosphere where consumers feel their journey is personalised, informed, and responsive (Calvaresi et al., 2021). Pattern recognition, data analysis, and adaptive learning are three areas in which artificial intelligence shines as a fundamental strength. This translates, within the context of virtual tourism, to A.I. systems that can analyse user behaviour, preferences, and previous interactions to offer bespoke virtual tours or experiences. After noting a user's proclivity towards historical sites in Europe, imagine a system recommending a virtual tour of Renaissance art in Florence or the ancient ruins in Rome. This would happen after the system has considered the user's preferences. This sophisticated tailoring, made possible by artificial intelligence, guarantees that virtual visitors are given content relevant to their interests and curiosities (Calvaresi et al., 2021).

However, the scope of artificial intelligence's (A.I.) effect on virtual tourism is not limited to merely making recommendations. A.I. algorithms, including those used in machine learning, can learn from user input and improve over time. If a tour is boring or overly long by a virtual traveller, the system can recalibrate future material to better correspond with the tastes of that particular user. This never-ending feedback loop, which A.I. powers, enhances the user experience over time, making it so that virtual tourism platforms remain interesting to each user and relevant to their specific needs. Chatbots, which act as digital concierges in virtual tourism, are at the forefront of this ecosystem, driven by artificial intelligence (A.I.) (Melián-González et al., 2019). Chatbots have already made their way into various businesses, but the potential for their use in virtual tourism is fascinating. Users can receive assistance in real-time from these chatbots, which are frequently driven by complex A.I. algorithms. These chatbots are designed to aid users as they navigate virtual destinations. Chatbots are ready to provide rapid solutions to various questions, including those regarding the history of a monument,

requests for recommendations for comparable attractions, and concerns with the technical aspects of a virtual tour. This instantaneous contact imitates the human touch of a tour guide or helpdesk, ensuring that consumers feel guided and supported during their virtual experience (Melián-González et al., 2019).

The ability of chatbots powered by A.I. to perform natural language processing (NLP) is another attractive feature of these programs. Chatbots can now understand customer enquiries and conversationally answer them thanks to Natural Language Processing (NLP), which helps bridge the gap between machine automation and human engagement. A virtual tourist might ask the chatbot, "What is the story behind the Eiffel Tower?" and the chatbot, by tapping into its extensive database and employing natural language processing, can deliver an answer that is succinct while yet being instructive, so boosting the user's immersion and learning. On the other hand, incorporating A.I. and chatbots into virtual tourism does not come without its share of difficulties. The level of sophistication of a chatbot's responses is directly proportional to the strength of the artificial intelligence that drives it (Pillai & Sivathanu, 2020). An early or rudimentary chatbot may provide generic, unpleasant, or even erroneous responses, which can detract from the experience of using the chatbot for the user. In addition, the whole nature of travel is predicated on unexpected discoveries, unplanned activities, and happy accidents, which is true even when travelling virtually. Excessive reliance on artificial intelligence to select and direct experiences may, ironically, tear away the exploratory spirit that is inherent to the activity (Pillai & Sivathanu, 2020).

Key Concepts	Technologies	Applications
Personalized Experience	Machine Learning Algorithms (e.g., recommendation systems)	By analyzing user behaviour and preferences, A.I. can tailor virtual tours to individual tastes, ensuring a more relevant and engaging experience.
Instant Assistance	Chatbot Platforms (e.g., Dialogflow, Microsoft Bot Framework)	Chatbots provide real-time answers to user queries, enhancing user experience by offering immediate support and information.
Natural Language Processing	NLP Libraries (e.g., SpaCy, NLTK)	Allows chatbots to understand and respond to user queries in natural language, making interactions more intuitive and user-friendly.
Interactive Narratives	Storytelling A.I. Engines	A.I. can craft or guide interactive stories based on user choices, leading to dynamic and personalized virtual tourism narratives.
Predictive Analytics	Predictive Modeling Tools	A.I. can anticipate user needs or preferences, suggesting activities or points of interest before the user asks.
Voice-Activated Assistance	Voice Recognition Systems (e.g., Google's Speech-to-Text)	Users can speak directly to chatbots, facilitating hands-free interactions, especially during immersive VR experiences.
Data-Driven Insights	A.I. Analytics Platforms	Tourism providers can gain insights from interactions with chatbots, helping refine offerings and improve user experience.
Multilingual Support	Translation A.I. (e.g., Google Translate API)	Chatbots can assist users in multiple languages, broadening the reach of virtual tourism platforms and making them accessible to a global audience.
Continuous Learning	Reinforcement Learning Algorithms	Chatbots can continuously evolve based on user interactions, ensuring that responses improve over time.
Integration with IoT	IoT Platforms & A.I. Integration	Combining A.I. with the Internet of Things, virtual tourism platforms can offer integrated experiences, like adjusting room lighting during a virtual hotel tour based on user preferences detected by the chatbot.

In virtual tourism, artificial intelligence (AI) and chatbots are the intersection of cutting-edge technology and user-centric design. They make interactions more efficient and personalise the virtual experience, giving each user the impression that their journey is distinctive. The significance of these technologies in forming immersive and responsive virtual tourism platforms will only become more prominent as these technologies improve (Pillai & Sivathanu, 2020).

However, as artificial intelligence advances, so will its mutually beneficial relationship with virtual tourism. Future versions of chatbots may see them become more complex, perhaps imitating human tour guides' ability to deliver stories. In the future, artificial intelligence may be able to anticipate travel patterns or growing interests,

curating content even before people express a desire for it. Artificial intelligence (A.I.) and chatbots are recalibrating virtual tourism paradigms through combined digital efforts. They plan to raise virtual tourism from merely visual spectacles to highly interactive and individualised adventures by providing individualised experiences and real-time help and nurturing a semblance of human touch inside a digital expanse. This will allow for more immersion for the tourist. Integrating artificial intelligence's analytical capabilities with the conversational grace of chatbots will shape a future in which virtual tourism will be just as interesting, educational, and exploratory as its real-world equivalent (Ukpabi et al., 2019).

In this section, VT key concepts and technologies were discussed to provide insight into the transformation that is taking the Tourism industry into new horizons. This section also discussed VT's broad applications and its substantial AI benefits that were tabled to exhibit the nascent developments heralding new dimensions impacting the Tourism industry. Innovative technologies discussed include contemporary technologies such as Virtual Reality, Augmented Reality and Tours, Interactive Platforms and Maps, Haptic Technology, Drone Videography, and Chatbots that provide tourists with a personalised virtual experience of their destinations in real-time and haptic nature, ensuring a joyful and memorable encounter. The following section is an example of significant tourism destinations in digitalized virtual tourism. These exemplars discussed will reflect the virtual aspects of the destinations, their profound successes, and imminent challenges. In addition to these virtual tourism case studies' inherent significance, they complement and enhance the research findings.

VIII. VIRTUAL TOURISM CASE STUDIES

The concept of virtual tourism, which was once in its infancy, has quickly become an established component of the tourism scene worldwide. As a result of technological advances, various tourist attractions, ranging from well-known museums to natural wonders, have begun offering virtual tours, thereby expanding their presence and reach around the world. This digital transition parallels traditional tourism and enables venues to engage with larger audiences, thereby capitalising on the benefits of this creative approach while successfully navigating the inherent problems that come with it.

The British Museum, London: Virtual Tourism Successes and Challenges: The British Museum, which can be found in the heart of London, is widely regarded as one of the most comprehensive museums in the entire world. Its collection covers more than two million years of human history. It has increasingly capitalised on the possibilities of virtual tourism to broaden its reach and serve a global audience, as has been the case with many other prominent cultural organisations. The British Museum's entry into virtual tourism is a prime example of the more significant trend in the cultural and tourism industries towards increased digital interaction (Dulyan & Edmonds, 2010). Challenges such as digital restrictions and worries about monetisation continue to exist even though there have been many triumphs. These successes include improved worldwide accessibility and educational outreach. However, as the digital world continues to develop, institutions such as the British Museum are well-positioned to handle these obstacles, ensuring that its treasures continue to be accessible and compelling to audiences worldwide, whether they are viewed online or in person (Jaffry & Apostolakis, 2010).

Successes: The British Museum's venture into virtual tourism has reached several significant benchmarks. Its extensive online platform has allowed audiences worldwide to explore its iconic artefacts, such as the Rosetta Stone and the Elgin Marbles (Dulyan & Edmonds, 2010). This has enabled it to overcome financial constraints and geographical distance hurdles. Visitors take part in an experience that is both immersive and instructive, courtesy of the technology behind Google Street View, thanks to a partnership with Google Arts & Culture. In addition, the museum's virtual presence has helped to strengthen its global brand. This is because digital explorers have been sharing their experiences on social media, increasing the number of virtual visitors. In addition, teachers have successfully incorporated the museum's digital resources into academic curricula, resulting in pupils developing a more profound understanding of the world's various cultures (Jaffry & Apostolakis, 2010).

Challenges: The British Museum has pioneered virtual tourism, yet this endeavour has its share of difficulties. Despite their extensive reach, virtual tours cannot replicate the complete sensory immersion and attention to detail visitors receive when visiting a real museum. Delivering high-quality, seamless digital interactions across various devices and platforms presents considerable challenges from a technological perspective. In addition, even though online interaction has increased dramatically, it is still difficult to translate this digital presence into concrete money (Dulyan & Edmonds, 2010). Online visitors do not provide the same financial benefits as their

on-site counterparts. Last but not least, there is always the possibility that the museum will become overly focused on digital exhibits, which might put the incomparable attraction and essential nature of the museum's physical presence in the background (Jaffry & Apostolakis, 2010).

Virtual Aspect	Successes	Challenges
Accessibility	Democratised access, allowing millions worldwide to explore the museum.	Digital tours cannot replicate the whole sensory experience of physically being in the museum.
Engagement	Collaborated with Google Arts & Culture, utilising Street View for an interactive experience enriched with detailed artifact information.	Technical limitations like slow loading times and ensuring compatibility across various devices and operating systems can hinder user experience.
Visibility	Enhanced global brand presence through increased traffic on digital platforms and social media shares.	Over-reliance on digital platforms may risk neglecting the physical museum experience.
Education	Provided educators with virtual resources to supplement classroom learning, promoting global cultural appreciation.	Misinformation or inaccuracies, if any, can spread quickly and lead to misconceptions about artifacts or the museum's significance.
Technical	Utilised high-resolution imagery and interactive platforms for a detailed and engaging virtual experience.	The need for robust technological infrastructure to support high-quality virtual tours poses challenges.
Monetisation	Potentially drew interest from virtual visitors who might consider a future physical visit.	Difficulty translating digital footfall into revenue, as virtual visitors may not spend the same way physical visitors do.

Machu Picchu, Peru: Virtual Tourism - Successes and Challenges: Machu Picchu, the illustrious Incan fortress located high in the Andes Mountains of Peru, is a UNESCO World Heritage site and is widely considered one of the most desirable tourist sites in the world. Because of its spectacular architecture, significant historical significance, and stunning natural environment, many people put it at the top of their "bucket list" destinations. Machu Picchu, like many other tourist destinations worldwide, has entered the domain of virtual tourism since the introduction of digitalisation in the tourism industry (Diestro Mandros et al., 2020). However, although virtual tourism provides an exciting and straightforward way for people worldwide to interact with locations such as Machu Picchu, it comes with difficulties. The importance of striking a balance between the advantages of improved accessibility and conservation, on the one hand, and the possible adverse effects on the economy and the irreplaceable characteristics of a physical visit, on the other, continues to be a central concern for locations that are considering virtual tourism. The challenge for Machu Picchu and other such locations will be to harness virtual tourism as a supplementary tool, ensuring that it complements rather than replaces the traditional tourist experience. This will be a significant step forward for tourism (Larson & Poudyal, 2012).

Successes: The accessibility of Machu Picchu has been transformed thanks to virtual tours, which have made it possible for people worldwide to experience the site's historical and artistic splendour without leaving their homes. This digital method provides a sustainable alternative that helps keep the ancient site from the wear and tear of mass tourists, but it also acts as an interactive educational tool, enriching worldwide curricula with Incan history and Andean biodiversity (Larson & Poudyal, 2012). In addition, these virtual trips allow individuals to explore the wonders of the location at their own pace without the restrictions of typical guided tours (Diestro Mandros et al., 2020).

Challenges: While virtual tourism brings Machu Picchu to a global audience, it falls short of replicating the site's authentic sensations, from the fresh Andean ambience to the profound emotional connections many experience there. Beyond the experiential gap, technical challenges arise, including ensuring fluidity, high-quality visuals, and cross-platform accessibility (Diestro Mandros et al., 2020). Moreover, the emphasis on virtual visits raises economic concerns, with nearby regions potentially seeing a decline in tourism revenue that underpins their economies. Furthermore, the digital realm poses risks of misinformation, necessitating rigorous accuracy checks to uphold the integrity of Machu Picchu's rich history and significance (Larson & Poudyal, 2012).

Virtual Aspect	Successes	Challenges
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Accessibility	Made Machu Picchu accessible to a global audience without needing a physical trip.	Cannot replicate the unique sensory and emotional experience of being physically present at Machu Picchu.
Engagement	Provides flexible exploration at one's pace without being bound by guided tour schedules.	Technical limitations like site crashes, lags, or subpar visuals can hinder the immersive experience.
Conservation	Offers a sustainable alternative to physical tourism, reducing wear and tear on the site.	The local economy, including businesses and guides, may suffer due to reduced physical tourist spending.
Education	Became a valuable tool for global educational institutions, facilitating virtual field trips and history lessons.	Potential for misinformation can lead to misconceptions about the site's history, significance, or architecture if not presented authentically.
Technical	Uses advanced technologies for a more immersive experience.	Ensuring platform compatibility across various devices, operating systems, and internet speeds is a substantial challenge.
Revenue	Draws global attention through online platforms.	Translating virtual footfall to revenue remains challenging, especially when virtual visitors are not spending in the local area.

Great Wall of China: Virtual Tourism - Successes and Challenges: One of the most well-known sites on the planet is the Great Wall of China, which has a total length of more than 13,000 miles and has been around for hundreds of years. Visits to the Wall traditionally involved making their way there on foot, where visitors could walk on the Wall's ancient stones, take in the breathtaking scenery, and get a sense of the Wall's weighty historical significance (Njerekai, 2019). However, with the rise of digital technology and the expansion of virtual tourism, this massive edifice has been made available to millions worldwide without requiring them to leave their homes (Su & Wall, 2012). Although virtual tourism presents a novel opportunity to explore the Great Wall of China, it should be viewed as a supplement to the conventional means of discovering this marvel rather than as a substitute for those methods (Su & Wall, 2012). It is necessary to find a balance, ensuring that while we harness the power of technology to bring the Wall to the globe, we do not decrease the significance of the physical pilgrimage to this ageless memorial of human endeavour. This is why it is so important to strike a balance (Yang et al., 2018).

Successes: The advent of virtual tourism at the Great Wall of China has democratised access, making it possible for people worldwide to experience its beauty despite the previously existing financial and geographical limitations. These tours, which provide pictures and educational insights about the Wall's history, culture, and construction, are beneficial resources for teachers because they offer more than simply vistas (Yang et al., 2018). These digital explorations also function as promotional tools, encouraging viewers to seriously consider making a real-life trip to the Great Wall of China and other destinations in China (Su & Wall, 2012). In addition, because it provides an alternative to actual site visits, virtual tourism may help to reduce the amount of damage that the increased number of visitors causes to the Great Wall of China (Njerekai, 2019).

Challenges: Since digital tours cannot reproduce the actual feelings and physical obstacles of being on-site, virtual tourism at the Great Wall of China has issues in offering visitors an immersive and comprehensive experience. Technical concerns like poor visual quality and device incompatibility can hamper the virtual experience (Njerekai, 2019). In addition, despite these trips raising awareness of the Wall, it is possible that they do not immediately contribute to the local economy, which depends on tourists. In addition, guaranteeing the historical and cultural authenticity of the content that is displayed virtually is of the utmost importance in order to prevent misunderstandings regarding the Wall's value (Yang et al., 2018).

Virtual Aspect	Successes	Challenges
Accessibility	Virtual tours make the Great Wall accessible globally, bypassing geographical and mobility barriers.	Virtual tours may lack the sensory and emotional impact of physical visits.
Engagement	Virtual tourism might offer interactive experiences, enabling visitors to explore	Maintaining user engagement and interest through a digital platform can be

	various sections of the Wall at leisure.	challenging, especially for such a vast monument.
Preservation	Virtual access might mitigate some of the physical wear and tear of massive tourist footfall, aiding conservation efforts.	Decreased physical tourism might impact local businesses and economies dependent on tourist spending.
Education	Virtual explorations can serve as an educational resource, providing historical and cultural insights about the Great Wall to global learners.	Ensuring accurate and comprehensive representation of historical and cultural facts can be challenging.
Technical	Leveraging technology like V.R. might create an immersive experience that showcases the Wall's grandeur and surrounding landscapes.	Ensuring smooth, high-quality digital experiences across various platforms and devices poses technical hurdles.
Monetisation	Potential to generate revenue through premium virtual experiences, partnerships, or digital merchandise.	Developing effective monetization strategies that do not compromise user experience or accessibility can be complex.

Taj Mahal, India: Virtual Tourism - Successes and Challenges: The Taj Mahal is a mausoleum made of ivory-white marble located on Agra, India's right bank of the Yamuna River. It is regarded as a symbol of everlasting love and great Mughal architecture. It is recognised as a World Heritage Site by UNESCO and thus receives millions of tourists annually. Virtual tourism projects have been created for the Taj Mahal in recent years to complement the physical influx of visitors and cater to those unable to travel there in person. Although these have been successful, they nevertheless come with their own unique set of difficulties (Dwivedi, 2009). The Taj Mahal, with its otherworldly beauty, serves as a shining example of India's extensive cultural heritage and historical legacy. This destination has the potential to be shared with the rest of the world through the use of virtual tourism, which has the power to cross borders. While it is laudable that the results have been achieved, the inherent problems must be addressed to guarantee that the digital portrayal of the Taj Mahal does the building's majesty and significance justice. Finding a happy medium between digital and traditional tourism in a rapidly growing digital world is increasingly vital for preserving and promoting cultural heritage assets (Shaikh et al., 2023).

Successes: Virtual tourism at the Taj Mahal has witnessed remarkable successes. Its primary achievement lies in offering global accessibility, allowing people from all backgrounds to appreciate the monument's details and artistry without travel constraints. These virtual tours provide more than just visuals; they are educational and packed with historical data, architectural insights, and cultural contexts, making them invaluable for educators teaching Mughal history or Indian art (Shaikh et al., 2023). Additionally, by offering an alternative to physical visits, these tours help conservation efforts, reducing the monument's wear and tear from over-tourism. Interestingly, many who indulge in these virtual experiences often feel compelled to experience the Taj Mahal in person, suggesting that virtual tourism can catalyze traditional tourism (Dwivedi, 2009).

Challenges: While there is much potential for success with virtual tourism at the Taj Mahal, there are also many obstacles to overcome. The digital platform's incapacity to recreate the monument's holistic atmosphere is the most significant obstacle. This includes the various colours of the monument at different times of the day, as well as the textured feeling of the marble. Further, even though people worldwide may now digitally see the Taj Mahal, this may negatively influence the local economy, particularly companies dependent on actual visitors (Shaikh et al., 2023). Delivering a high-quality and uninterrupted virtual experience can be challenging from a purely technological aspect, particularly when it comes to a monument with as much attention to detail as this one. In addition, guaranteeing the virtual tour's truth and authenticity is of the utmost importance since any misrepresentation can lead to misunderstandings regarding the Taj Mahal's extensive history and cultural significance (Dwivedi, 2009).

Virtual Aspect	Successes	Challenges
Accessibility	Virtual tours allow global audiences to experience the Taj Mahal without travelling to India.	There is no valid substitute for experiencing the Taj Mahal in person; the essence, ambience, and grandeur may be lost in a digital medium.

Engagement	Interactive features on virtual platforms can provide detailed insights about various aspects of the monument.	Retaining user engagement in a virtual setting compared to the awe-inspired engagement of physical visits can be difficult.
Educational Outreach	Schools and institutions globally can use virtual tours as an educational resource to teach about Mughal architecture and Indian history.	Ensuring accuracy and depth in content can be challenging. Misinformation or over-simplification could lead to misconceptions.
Conservation	Reduced footfall due to virtual tourism might help conserve the monument and its surroundings.	The local economy, heavily reliant on tourist spending, could face challenges if there is a significant dip in physical visitors.
Technical	Advances in V.R. and A.R. can make the virtual experience highly immersive and close to the real thing.	Technical issues like site crashes or glitches can disrupt the user experience. Also, ensuring compatibility across devices is crucial.
Brand Visibility	Digital initiatives can enhance the global brand presence of the Taj Mahal and keep it relevant in the digital age.	Over-reliance on virtual tourism could potentially dilute the exclusivity and allure associated with the monument.
Economic Considerations	Virtual tourism might open up newer revenue streams through online advertising, partnerships, and premium virtual experiences.	Direct revenue generation from virtual tours might not compensate for the revenue generated from on-site visitors, ticket sales, and related tourist expenditures.

Virtual Tourism at Dive Sites Worldwide: A Deep Dive into Successes and Challenges: The spectacular underwater environment, with its colourful coral reefs, enigmatic shipwrecks, and abundant marine life, has always been one of the most popular reasons for people to go on vacation. The Great Barrier Reef in Australia is one of the most famous dive locations in the world because it provides divers with unmatched sensations in the water (Daldeniz & Hampton, 2012). However, what happens when physical limitations, such as worries about health, cost, or the environment, limit the scope of this exploration? Here comes the age of virtual tourism. Because of recent technological advances, numerous dive locations worldwide have begun offering virtual tours, allowing diving aficionados to participate in immersive encounters without leaving the comfort of their homes. On the other hand, just like any other solution, virtual tourism at diving locations has both its advantages and disadvantages. The potential for virtual tourism at diving sites worldwide, including well-known landmarks like the Great Barrier Reef, is practically limitless. Although it successfully democratizes maritime exploration and emphasizes conservation, its issues must be addressed to preserve a healthy balance between virtual and physical tourism. Utilising virtual tours to supplement actual dives is the key to securing a more promising future for marine ecosystems and the tourism industry stimulated by these habitats (Hawkins et al., 1999).

Successes: Virtual dive tours, especially of renowned sites like the Great Barrier Reef, democratize marine exploration, making it accessible to individuals regardless of age or diving expertise. These tours offer significant educational value by providing detailed annotations and voice-overs about marine ecology, species behaviours, and conservation. Additionally, with threats from over-tourism and environmental changes impacting marine ecosystems, virtual tourism presents an ecologically friendly alternative, emphasising the importance of marine conservation. Moreover, these virtual experiences often spark interest in viewers, potentially motivating them to pursue actual diving in the future, thereby promoting continued interest in marine tourism (Daldeniz & Hampton, 2012).

Challenges: While virtual dive tours offer a glimpse into the underwater world, they cannot replicate the complete sensory experience of diving, missing out on the sensations of weightlessness, underwater breathing, and the marine world's ambient sounds (Daldeniz & Hampton, 2012). Additionally, there are economic concerns as local businesses, including dive instructors, rental shops, and accommodations, rely on the revenue generated from physical tourists. Technical challenges arise in capturing consistent high-definition underwater imagery and ensuring a smooth user experience across devices. Furthermore, these tours must present an authentic representation of marine ecosystems, as misleading visuals or information can distort users' understanding of the underwater environment's actual state (Daldeniz & Hampton, 2012).

Virtual Aspect	Successes	Challenges
Accessibility	It makes underwater wonders accessible to non-divers and those unable to visit dive sites in person.	Replicating the sensory and immersive experience of actual diving is challenging in a virtual platform.
Engagement	Interactive elements, such as character narratives or behind-the-scenes footage, can be integrated into the virtual experience for a richer engagement.	Creating an engaging virtual experience that rivals the excitement of a physical tour can be challenging.
Education & Awareness	Virtual tours can educate viewers about marine life, coral reefs, and the importance of marine conservation.	Ensuring accurate and updated information about ever-changing marine ecosystems can be demanding.
Technical	360-degree underwater cameras, augmented reality, and V.R. headsets can offer a semi-immersive experience of dive sites.	Ensuring high-quality streaming, especially in regions with slow internet, and maintaining the realism of vibrant underwater colours can be technically challenging.
Environmental Impact	Reduces the environmental impact on delicate coral ecosystems by lessening physical tourist footfalls while raising awareness about marine conservation.	Local businesses and economies that rely heavily on dive tourism might face revenue challenges due to reduced physical visitors.
Promotion	Virtual dives can inspire and motivate enthusiasts to get diving certifications and plan actual trips, boosting future physical dive tourism.	There is stiff competition from various underwater documentaries and films, so creating a unique selling proposition for virtual dive tours is essential.
Monetisation	Potential to generate revenue through premium virtual dives, exclusive content, collaborations with marine organizations, or online diving certifications.	Balancing between offering free experiences to promote marine awareness and generating sufficient revenue can be tricky.

New Zealand's Middle-Earth Tour in the Age of Virtual Tourism - Successes and Challenges: As a result of Peter Jackson's film adaptations of J.R.R. Tolkien's "The Lord of the Rings" and "The Hobbit," New Zealand has become a popular tourist destination among fans worldwide. These films were based on Tolkien's "The Hobbit" and "The Lord of the Rings." The country, well-known for its spectacular landscapes, has deftly incorporated several renowned film locations into its travel and tourist sector. The proliferation of virtual tourism affords travellers a once-in-a-lifetime opportunity to immerse themselves in the magical world of Middle Earth, but it also raises new questions and problems (McAvan, 2009).

Successes: The advent of Middle-Earth-themed virtual tourism in New Zealand has brought many triumphs. Access has been democratised, allowing Tolkien fans worldwide to virtually tour classic destinations such as the Shire and Rivendell, regardless of financial or health limitations. Surprisingly, these virtual glances frequently serve as tantalising teasers, creating a desire in fans to embark on genuine visits to New Zealand. This has the potential to enhance actual tourism in the country. In addition, the virtual tours contain a wealth of educational material, such as insights into the making of the movies, facts about geology in great detail, and in-depth explorations of Tolkien's universe. Virtual tourism is emerging as a feasible way to mitigate the pressure while sustaining interest in New Zealand's cinematic landscapes. This is particularly important given the fact that excessive tourism poses a threat to the preservation of New Zealand's film settings. The implementation of virtual tours for Middle-Earth in New Zealand brings potential as well as obstacles. While they make Tolkien's enchanted world more available to fans worldwide, they must be carefully managed to ensure that the traditional tourist model is not replaced but rather that it serves as a complement to what they offer. The key to success in this field is utilising virtual tourism as an enhancing tool rather than as one that detracts from the attraction of the actual physical experience (Howison et al., 2014).

Challenges: Bringing Middle-Earth in New Zealand into virtual tourism will involve overcoming several obstacles. To begin, there is no digital medium that can completely encompass the multi-sensory splendour that is Middle-Earth. This includes everything from the aroma of freshly cut grass in the Shire to the melodious streams in Rivendell. On the economic front, local companies heavily interwoven with the Middle-Earth concept

may see income drops if virtual tours significantly reduce the number of physical tourists. Providing an error-free and high-definition virtual experience across various devices is challenging from a technical standpoint. In addition, it is essential to strike a balance in portrayal. Placing excessive emphasis on Tolkien's fantasy world risks overshadowing New Zealand's rich Maori tradition, natural diversity, and historical relevance (Morgan et al., 2002).

Virtual Aspect	Successes	Challenges
Accessibility	Fans from across the globe can explore film set locations, even if they cannot visit New Zealand in person.	Virtual tours might not capture the physical locations' full splendour and atmospheric charm.
Engagement	Interactive elements, such as marine life databases or narratives from marine biologists, can enhance the virtual diving experience.	Capturing and maintaining user engagement without the tactile and emotional experiences of real diving.
Brand Association	New Zealand strongly associates with "Middle-Earth," making virtual tours exciting for fans worldwide.	There might be an over-reliance on the "Middle-Earth" brand, potentially overshadowing other attractions in New Zealand.
Technical	Leveraging technology like V.R. might create an immersive experience that showcases the Wall's grandeur and surrounding landscapes.	Ensuring smooth, high-quality digital experiences across various platforms and devices poses technical hurdles.
Environmental Impact	Virtual tourism can help conserve delicate ecosystems or prevent wear and tear on frequently visited film locations.	The balance between promoting virtual tours and ensuring local businesses that rely on physical tourism continue to thrive can be delicate.
Promotion	Virtual tours can serve as promotional tools, enticing viewers to consider planning a physical trip to Iceland.	Overemphasis on virtual experiences might lead potential tourists to skip the physical visit.
Monetization	Potential to generate revenue from premium virtual experiences, exclusive content, merchandise, or collaborations linked to the Middle-Earth brand.	Ensuring that the virtual tours provide a substantial revenue stream, especially compared to the income from physical tourism, might pose challenges.

Virtual Tourism at Mount Everest, Nepal: Successes and Challenges: Mount Everest, the tallest peak in the world, has long had a particular place in people's hearts. With its towering 8,848 metres above sea level, this magnificent mountain draws travellers and adventurers worldwide. However, not everyone has the time, money, or physical capacity to hike or attempt a summit through the Himalayas. This is where the travel industry's newest trend, virtual tourism, comes into play (Nepal, 2005). While virtual tourism at Mount Everest opens up previously unimaginable access and educational opportunities, it also presents several technical, financial, and ethical issues that must be carefully considered and planned for. The route forward must be paved by combining the immersive potential of digital platforms with a mindful approach that honours and respects the cultural, environmental, and experiential integrity of this famous terrain. This will allow for the creation of a path that leads forward (Stevens, 2003).

Successes: It has been made possible for individuals from all over the world to experience the majesty of Mount Everest without ever having to leave the comfort of their homes, thanks to the development of virtual tourism at the world's tallest peak, Mount Everest. This has fundamentally altered tourists' access to the summit of the tallest peak in the world. These multimedia tours, packed with instructional content and highlighting Everest's history, geographical relevance, and cultural significance, have proven to be an essential resource for instructors and students. In addition to their role as a teaching tool, the immersive graphics serve to spark the viewer's curiosity in different places and have the ability to motivate them to go on future trips. Importantly, this tourism helps preserve Everest's delicate ecosystems by decreasing the direct human influence exerted on those ecosystems. Providing a digital alternative to the more conventional in-person visits results in the achievement of this goal (Stevens, 2003).

Challenges: Although groundbreaking, Mount Everest's virtual tourism faces several hurdles. Virtual platforms cannot reproduce the multisensory allure of the mountain, including the fresh air, the snow crunch, and the thrill of the altitude. In addition, although these excursions broaden access to the world, they may harm the local economy (Stevens, 2003). This will be especially true for the Sherpas, the guides, and the businesses dependent on trekkers. In order to provide a bug-free and high-definition experience of Everest's immense geography, several technical obstacles must be overcome. Furthermore, there is an urgent need to appropriately show the Sherpa culture and the environmental problems surrounding Everest. This is necessary to ensure that digital representations do not continue to promote prejudices or misinform consumers (Stevens, 2003).

Virtual Aspect	Successes	Challenges
Accessibility	Virtual tours make the formidable experience of Everest accessible to those unable to undertake the physically challenging and risky journey.	The adrenaline and personal accomplishment of scaling the world's highest peak cannot be replicated in a virtual environment.
Engagement	Interactive features and 360-degree views can offer detailed insights and panoramic experiences of various base camps and perhaps the summit.	Capturing the full magnitude, serenity, and raw beauty of Everest and its surrounding region is a challenge in any digital format.
Education & Awareness	Virtual platforms can serve as a resource for schools and institutions teaching about geography, mountaineering, and the unique Sherpa culture.	Maintaining educational depth and avoiding oversimplification is essential to avoid misconceptions.
Technical	High-resolution imagery, drone footage, and V.R. can provide an almost lifelike experience of the mountainous terrain.	Technical glitches, loading issues, or incompatibilities can hamper user experience. High-quality visuals also demand robust technological support.
Environmental Impact	Virtual tours can reduce the human impact on the mountain, leading to less litter, fewer rescue missions, and a lower environmental footprint.	Depending on trekking and climbing tourism, local economies might face economic setbacks due to decreased physical trekkers.
Brand Visibility	Digital experiences can keep Everest's allure alive in popular culture and global consciousness, even during off-trekking seasons or pandemic restrictions.	There is a potential risk of diluting Everest's exclusivity and revered status by making it too 'commonplace' through easy virtual accessibility.
Economic Considerations	With premium virtual experiences, collaborations, and partnerships, virtual tourism can open alternative revenue streams for the region.	Direct revenue from virtual tours may not equate to the earnings generated from on-site trekkers, climbers, and related tourism services.

Kyoto, Japan: Successes and Challenges of Virtual Tourism: One of the most cherished locations in Japan is Kyoto due to the city's extensive past and cultural legacy. This once-great capital city is now a fascinating mix of the modern and the ancient, with modern skyscrapers and traditional teahouses coexisting peacefully in the same neighbourhood. Even a city as ancient and traditional as Kyoto has begun to explore the possibilities presented by virtual tourism as the world has transitioned into the digital era. In this section, we will discuss both the positive and negative aspects of this change. Virtual tourism presents a game-changing opportunity to share Kyoto with the rest of the globe but has some significant drawbacks. The true difficulty lies in striking a balance between utilising technology to improve accessibility and ensuring that the essence of this ancient city is not watered down or misrepresented in any way while at the same time ensuring that accessibility is improved. The skilful management of these triumphs and challenges will be essential to the further growth of Kyoto's virtual tourist industry (Nakaya et al., 2010).

Successes: The development of Kyoto's virtual tourist industry has allowed for the city's most famous sites, such as the Golden Pavillion and the Nishiki Market, to be accessed by people worldwide. These digital endeavours serve as instructional platforms that elucidate the city's rich cultural and historical fabric and act as exhibitions of the city's well-known seasonal transformations (Nakaya et al., 2010). It is interesting to note that the immersive quality of these virtual encounters can serve as powerful promotional tools, igniting a desire among virtual

visitors to experience the city's beauty firsthand. This finding lends credence to the idea that virtual exploration might prepare the way for genuine visits (Tsai et al., 2019).

Challenges: The pioneering practice of virtual tourism in Kyoto has its share of difficulties. With all of its progress, the digital world cannot reproduce the intense sensory pleasures of strolling through Gion or sipping matcha in a traditional tea house (Nakaya et al., 2010). A further concern is that the city of Kyoto's local craftspeople, innkeepers, and rickshaw pullers could find ways of making a living put in jeopardy if a greater emphasis is placed on virtual tourism. There are still many technical hurdles to overcome, and it is up to service providers to make sure that their offerings are smooth, of the highest quality, and accurately reflect Kyoto. Above all else, there is an urgent need to accurately portray the vast cultural complexity of Kyoto while avoiding oversimplification or unintended exoticisation (Tsai et al., 2019).

Virtual Aspect	Successes	Challenges
Accessibility	Virtual tours offer worldwide access, allowing people from distant locations to explore Paro Valley's beauty and cultural richness.	Some areas of the Paro Valley might not be accessible for capturing virtual content due to geographical or cultural restrictions.
Educational Outreach	Virtual platforms can incorporate interactive features about Bhutan's history, traditions, and the significance of landmarks like the Tiger's Nest Monastery.	Ensuring accuracy and depth in educational content so it does not simplify or misrepresent the rich Bhutanese culture.
Cultural Appreciation	Virtual tourism can showcase and celebrate Bhutan's unique cultural and spiritual practices, promoting understanding.	There is a risk of oversimplifying or misrepresenting local customs, traditions, or spiritual practices, leading to potential misconceptions.
Technical	Advanced tech can offer 360-degree views, AR integrations, and interactive maps, enhancing user experience.	Remote and rugged areas might pose challenges for capturing high-quality visuals, and ensuring a glitch-free user experience can be demanding.
Environmental Impact	Reducing the physical footfall in historically significant and delicate locations can aid their preservation. It also cuts down the carbon footprint of travel.	Local businesses, including traditional ryokan (inns), tea houses, and artisanal shops, which heavily rely on tourism, might face challenges due to reduced physical tourists.
Promotion	Virtual experiences can act as teasers, inspiring individuals to plan actual trips to Kyoto, thereby promoting future physical tourism.	Differentiating Kyoto's virtual tourism offerings from many documentaries, films, and other digital content about the city.
Monetisation	Potential to introduce premium virtual tours, collaborations with local artisans for online workshops, or exclusive content about Kyoto's festivals and events.	Translating virtual footfall into tangible financial benefits, especially when compared to the spending of physical tourists on accommodation, food, souvenirs, and local experiences.

Paro Valley of Bhutan: Successes and Challenges of Virtual Tourism: The Paro Valley in Bhutan is a stunning example of nature's majesty and the ingenuity of human architecture. The valley is located in the heart of the Himalayas. Paro is a place that many people picture themselves visiting in their dreams because of its serene monasteries, old forts, and verdant landscapes. With the advent of technology and the rise in popularity of virtual tourism, Paro Valley has also ventured into the world of digital tourism, extending an invitation to people worldwide to enjoy the valley's allure from a distance. Although it opens up many opportunities in Paro Valley, virtual tourism is a double-edged sword (Suntikul & Dorji, 2015).

On the one hand, it broadens the boundaries by making Paro accessible to audiences worldwide. However, on the other hand, it raises economic, technical, and ethical obstacles. The objective is to strike a balance that ensures that even while the rest of the world is experiencing Paro digitally, the valley maintains its originality, attractiveness, and capacity to be sustainable (Brunet et al., 2001).

Successes: Virtual tourism in Paro Valley has broadened global exposure, overcoming Bhutan's restrictive tourist quotas and tariffs and allowing individuals to explore iconic sites like the Tiger's Nest Monastery virtually. These virtual ventures serve as educational tools, offering insights into Bhutanese culture and Himalayan ecology (Brunet et al., 2001). Furthermore, these digital glimpses often ignite a desire for physical visits as promotional teasers to potentially boost future tourism. Aligning with Bhutan's emphasis on sustainability, virtual tourism promotes environmental conservation by diverting a segment of potential physical tourists to digital platforms, thereby safeguarding Paro's ecological harmony (Suntikul & Dorji, 2015).

Challenges: Virtual tourism in Paro Valley faces challenges, including its inability to capture the valley's comprehensive sensory experience, from the Himalayan breeze to authentic Bhutanese flavours. Additionally, while virtual platforms widen access, they do not directly bolster the local economy, potentially affecting local guides, artisans, and innkeepers (Suntikul & Dorji, 2015). Technically, representing Paro's diverse terrains and ensuring consistent streaming quality is demanding. Lastly, there is a persistent risk of misrepresentation or oversimplification in virtual tours, which might not accurately reflect Paro's rich cultural, spiritual, and ecological essence (Brunet et al., 2001).

Virtual Aspect	Successes	Challenges
Accessibility	Virtual tours offer worldwide access, allowing people from distant locations to explore Paro Valley's beauty and cultural richness.	Some areas of the Paro Valley might not be accessible for capturing virtual content due to geographical or cultural restrictions.
Educational Outreach	Virtual platforms can incorporate interactive features about Bhutan's history, traditions, and the significance of landmarks like the Tiger's Nest Monastery.	Ensuring accuracy and depth in educational content so it does not simplify or misrepresent the rich Bhutanese culture.
Economic Impact	Virtual tours can serve as promotional tools, enticing travellers to plan a physical visit in the future.	A rise in virtual tourism might reduce immediate revenue for local guides, artisans, and businesses reliant on in-person tourists.
Conservation	By offering an alternative to physical visits, some pressure from over-tourism on sensitive sites might be alleviated.	Virtual tourism might inadvertently promote areas that are better left undisturbed, leading to potential ecological or cultural harm.
Technical Implementation	Advanced tech can offer 360-degree views, AR integrations, and interactive maps, enhancing user experience.	Remote and rugged areas might pose challenges for capturing high-quality visuals, and ensuring a glitch-free user experience can be demanding.
Cultural Representation	Virtual tourism can showcase and celebrate Bhutan's unique cultural and spiritual practices, promoting understanding.	There is a risk of oversimplifying or misrepresenting local customs, traditions, or spiritual practices, leading to potential misconceptions.

The Northern Lights and Virtual Tourism in Iceland: Successes and Challenges: People worldwide have been mesmerised for decades by a natural phenomenon known as the Aurora Borealis, often known as the Northern Lights. These ethereal lights provide an unrivalled visual display as they move over the night sky. Because of its advantageous geographical position, Iceland has long been a popular travel destination for those who wish to view this natural phenomenon. In this day and age of advanced computing, the phenomenon of the Northern Lights may now be experienced by people worldwide thanks to the advent of virtual tourism. Virtual tourism centred around Iceland's Northern Lights brings a plethora of achievements and problems, just like any other form of innovation. The Northern Lights in Iceland can be experienced in a creative and informative way through the use of virtual tourism. Nevertheless, it is vital to strike a balance to guarantee that the core of the experience is maintained while also ensuring that the local populations continue to benefit. Stakeholders in the tourism industry need to negotiate the successes and challenges presented by the rapid evolution of technology in a prudent manner (Winter Skies, 2023).

Successes: Virtual tourism in Iceland provides a broader and more inclusive Northern Lights experience. It enables anyone worldwide to observe the phenomena regardless of expense, personal constraints, or

environmental circumstances. These internet platforms not only make the show Iceland available throughout the entire year, but they also provide enlightening educational insights into the science, history, and culture that are related to the Auroras. In addition, this forward-thinking strategy contributes to preserving Iceland's delicate ecosystems, which encourages less harmful tourism to the environment by reducing the number of actual tourists who visit the country (Varnajot & Saarinen, 2021).

Challenges: While virtual tourism offers broader access to Iceland's Northern Lights, it cannot replicate the authentic, immersive feeling of witnessing the phenomenon firsthand amidst the nation's landscapes. This growing digital trend, though expanding reach, might impede the country's tourism-dependent economy, potentially affecting local businesses and tour operators. Technical challenges also arise in accurately capturing and streaming the auroras' complex dynamics. Moreover, as virtual platforms strive to create more appealing content, there is a risk of over-commercializing this natural marvel, possibly diluting its essence and the rich cultural context of Iceland (Varnajot & Saarinen, 2021).

Virtual Aspect	Successes	Challenges
Accessibility	Provides people worldwide the opportunity to witness the Northern Lights from the comfort of their homes, making this natural spectacle more universally accessible.	The experience of witnessing the Northern Lights in person, feeling the cold air, and being surrounded by Iceland's vast landscapes is challenging to capture in a virtual setting.
Engagement	Utilising augmented and virtual reality, users can get a more immersive experience of the lights, adjusting views, and zoom levels for a customised experience.	Maintaining prolonged interest and engagement in a phenomenon that is essentially visual, without the auxiliary experiences of being in Iceland.
Cultural Appreciation	Alongside the visual spectacle, virtual platforms can offer scientific explanations, local legends, and cultural significance of the Northern Lights, enhancing understanding and appreciation.	Ensuring accurate and comprehensive information is shared, balancing the technical and scientific details with local cultural narratives without overwhelming the virtual tourist.
Technical	With high-definition cameras and real-time streaming, virtual tourists can witness the Northern Lights in vibrant detail and clarity.	Streaming the dynamic and vibrant lights in real-time with high quality, especially during peak viewing times, can pose bandwidth challenges. Ensuring accessibility across various devices and platforms can also be demanding.
Environmental Impact	Decreasing the number of physical tourists in Iceland can reduce environmental strain and carbon footprints associated with international travel.	Local businesses, such as tour operators, hotels, and restaurants in Iceland, which rely heavily on Northern Lights tourism, might face challenges due to a reduced number of physical tourists.
Promotion	Virtual experiences can act as teasers, encouraging individuals to plan actual trips to Iceland in the future to witness the Northern Lights and explore the country.	Differentiating Iceland's virtual Northern Lights offerings from other regions where this phenomenon is visible and from the many available videos and documentaries about the Northern Lights.
Monetization	Potential to generate revenue through premium virtual experiences, collaborations, or digital content sales related to the Northern Lights.	Translating digital footfall into substantial revenue, especially when compared to physical tourism, can be complex.

These examples demonstrate that virtual tourism is an influential tool destinations may use to display their offers, stories, and distinctive selling propositions. These destinations cater to a worldwide audience by blending technology, storytelling, and accessibility. They can do this because they transcend geographical, financial, and physical constraints. In addition, virtual tours represent an eco-friendly exploration technique in a world where sustainable tourism is gaining momentum. They reduce the amount of foot traffic in vulnerable areas while presenting the attractiveness of the explored locations. These instances demonstrate that the digitisation of

experiences is not just a fad; instead, it is the unavoidable path that the tourism sector worldwide will take in the years to come.

In this section, the exemplars represented by case study discussions of successes and challenges of VT destinations using VR and AI technologies complement the research findings on venturing into Virtual Tourism. Factors related to the determinants correspond to demand for VT, and the determinants for the satisfaction level for VT. Generalizing the value of the successes, the case studies on VT transport tourists into a new dimension of travel, enabling accessibility, engagement, education, and preserving sustainability with global destinations. The case studies also examined the challenges of technology, lack of tactile and haptic connections, economic and social imbalance, and superficial exploration of tourist destinations. The following section will evaluate VT's advantages and limitations, providing valuable perspectives and opportunities.

IX. ADVANTAGES OF VIRTUAL TOURISM

This paper will examine the advantages of the travel business with the onset of an emerging field - Virtual Tourism- made possible by technological innovation. The paper has provided numerous cases of VT with unique ways to explore locations without leaving the convenience of their homes. When one investigates the numerous benefits of this rapidly expanding phenomenon, one discovers that it has both practical and economic advantages and can develop global comprehension, inclusion, and environmentally responsible practices. One of the primary benefits of virtual tourism is that it makes travel experiences more accessible to more people (Seraphin, 2017). Not everyone has the financial resources, the opportunities, or the physical capabilities to travel to other locations worldwide. Many people are dissuaded from experiencing the wonders of the globe due to factors such as financial restraints, health concerns, or stringent visa regulations. This chasm can be bridged by virtual tourism, particularly after the COVID-19 pandemic that created havoc on the tourism industry from 2000 to 2022. The travel industry has grown to take a new dimension to travel-like and real-time experiences without more conventional restrictions. Anyone with an internet connection will be able to access iconic landmarks, historic sites, and even rural locations. Because of this inclusivity, the pleasures of enquiry and discovery are no longer restricted to a select group of wealthy individuals (Yu et al., 2023). In addition, there is significant room for growth in the education offered through virtual tourism. These digital tools can be leveraged by educational institutions such as schools and universities to provide students with learning experiences that are more immersive. Imagine a history class in which students can virtually stroll through ancient ruins or a biology session in which they may explore the depths of the Amazon rainforest. These are just two examples of how virtual reality is being used in the classroom. These virtual excursions can considerably enrich the teaching process, which provides practical settings for the theoretical knowledge being taught. To ensure that their collections can educate and inspire people beyond the constraints of their physical sites, museums have also begun conducting virtual tours of their exhibits (Marasco, 2020).

Although there have been some worries regarding the impact that the growth of virtual tourism may have on traditional tourism sectors, there is also an opportunity for economic diversification presented by this trend. Providing premium content or customised virtual tours is one way for locations to generate revenue from virtual encounters. These can be used as extra revenue streams, especially during off-peak seasons or unanticipated occurrences like worldwide pandemics (Seraphin, 2017). In addition, a fascinating virtual tour can serve as an effective promotional strategy by igniting the traveller's desire to visit the location in person, which may result in increased tourism in the future. Regarding the protection of the natural world, the principles of sustainable travel and virtual tourism are perfectly compatible. The environmental impact of international flights, the wear and tear on major tourist attractions caused by overcrowding, and the pressure on local resources can all be reduced if some people consider travelling instead of engaging in virtual experiences. As growing concerns about climate change and environmental damage are brought to the forefront, virtual tourism presents a workable alternative by enabling exploration without exploitation (Lytras, 2011).

Another significant benefit is the accessibility that virtual tourism provides throughout the entire year. Several locations offer attractions only available during certain times of the year, such as cherry blossoms, wildlife migrations, or cultural events. Due to time conflicts, travellers who see these spectacles in person risk missing them. On the other hand, virtual platforms can capture and display these events throughout the year, making it possible for tourist to observe them regardless of their access date. The adaptability and ease of use offered by virtual tourism are advantages that cannot be emphasised. Travel planning, which is typically a complicated process that involves cost estimation, the creation of an itinerary, and the coordination of many logistics, is made more accessible. Virtual tourists are free to explore a location at their convenience, unencumbered by the

passage of time, the elements, or any other variable that may affect their experience. Because of its convenience and versatility, virtual tourism is becoming increasingly popular among younger, tech-savvy travellers (Govers, 2005).

There is more to it than merely going to the attractions. Interactive experiences are currently available on the most advanced types of virtual platforms. These experiences range from digital workshops on traditional crafts to online cooking classes taught by chefs worldwide (Seraphin, 2017). These interactive components allow for a more profound immersion in the culture, helping to bridge cultural divides and promote global understanding. The benefits of virtual tourism are widespread, spanning various sectors, including accessibility, education, economics, sustainability, convenience, and the exchange of cultural traditions. The world's perspective on tourism is changing due to the rise of virtual travel, which has become increasingly popular even though it cannot and should not replace actual travel. It is possible to create a worldwide community that is more inclusive, sustainable, and integrated by embracing the concept of virtual tourism with an in-depth grasp of its value proposition (Tajeddini et al., 2020). However, there are limitations and concerns with VT. No doubt, innovative technology comes with issues and concerns. Next, discussing the limitations and concerns of technology will be a good balance in this paper.

X. LIMITATIONS AND CONCERNS OF VIRTUAL TOURISM

The advent of virtual tourism has undoubtedly ushered in a plethora of potential and advantages. However, delving further into this paradigm shift has revealed several constraints and causes for concern. These problems provide technical and experiential hurdles and raise more significant questions about authenticity, economic impact, and the very core of travel itself as virtual tourism continues to increase its reach and influence. The debate surrounding the genuineness of virtual experiences is at the forefront of these worries. A genuine travel experience includes the views and the destination's sounds, smells, tastes, and tactile sensations. It is still challenging to duplicate the whole human sensory experience, even with the most modern technologies available for virtual reality. The gratifying crunch of cobblestones underfoot, the heady scent of a bustling spice bazaar, or the soothing hum of a far-off folk song are all components that are inextricably bound up in the essence of the travel experience. Their absence or digital reproduction in a virtual environment may lead to a diluted or skewed knowledge of a location and its culture.

The repercussions to the economy are also significant (Cheong, 1995). Tourism is a significant primary source of income for a great number of countries and regions all over the world. Because of the meteoric expansion of virtual tourism, there is now a possible risk to the economies of physical locations. Local companies dependent on tourist spending could experience a period of instability if a considerable proportion of potential tourists choose virtual tours rather than in-person visits. This includes local enterprises such as artisans and tour guides, as well as accommodation and transportation services. The broader economic repercussions could dramatically impact, resulting in fewer employment prospects and increased social issues in areas traditionally dependent on tourists' profits (Seraphin, 2017). The nature of the technology itself presents still another significant barrier. Although there have been remarkable developments in virtual reality, augmented reality, and similar technologies, these innovations have limitations. Technological solid infrastructure is required to stream interactive high-definition settings 360 degrees around the viewer. Not everyone interested in a virtual vacation can access high-end technology or reliable internet connections for the best possible experience. This results in a digital gap, in which certain groups of people may be prevented from accessing these virtual platforms, which is ironic given that virtual tourism aims to democratise travel (Lu et al., 2021).

In addition, the portrayal and representation in virtual tours are worthy of close examination. There is a real possibility of simplifying, distorting, or exoticizing different cultures and locations than they are. Virtual tourism platforms risk unintentionally perpetuating stereotypes or providing a biased perspective since they lack the checks and balances of experience and engagement. This not only does a disservice to the region and the people who live there but also runs the risk of giving the virtual traveller erroneous perceptions of the location. There is also a psychological dimension to consider (Cheong, 1995). The essence of travel often involves stepping out of one's comfort zone, experiencing personal growth, and forging genuine connections with people from diverse backgrounds. Over-reliance on virtual tourism could limit these enriching experiences. The challenge and reward of navigating a foreign city, the personal growth from overcoming travel adversities, or the serendipity of unplanned encounters are dimensions of travel that a virtual experience might never fully capture (Yousuf & Ali, 2018).

Finally, there is the matter of data privacy and security. As virtual tourism platforms collect data on user preferences, behaviours, and interactions, concerns arise regarding how this data is stored, used, and potentially shared. Users could be exposed to privacy breaches or unwanted marketing aggressions without stringent data protection regulations and transparent practices. While virtual tourism holds immense potential, it is imperative to approach its growth with a nuanced understanding of its limitations and concerns (Cheng & Huang, 2022). These challenges span experiential, economic, technological, representational, psychological, and ethical dimensions. As the world stands at the cusp of further integrating virtual experiences into the tourism sector, a balanced perspective—one that recognizes the merits of virtual tourism while being cognizant of its pitfalls—will be crucial in shaping a future where technology complements rather than supplants the enriching tapestry of global travel (Marasco, 2020).

This section explored the advantages and limitations of VT. Among the advantages for VT, it was evident that VR functionality proved to be enormously beneficial to the industry, particularly during the COVID-19 pandemic of 2020 to 2022. It bridged the gap for travellers' inability to visit their tour destinations, some for health restrictions, COVID-related unemployment, financial hardships, and political and environmental crises. VT technologies provide an alternative to their tour destinations' virtual experience and plan when appropriate. The industry leveraged virtual tourism to provide interactive experiences for promoting destinations, allowing travellers to book tours, flights, and accommodations in advance with convenient instalment packages—no doubt there will be limitations. The application of VT drew users' attention to new technological tools, the cost-effectiveness of the VT, social and economic issues, privacy, and cybersecurity. Nevertheless, it is quite clear from the evaluation that there are more advantages than limitations for VR in the Tourism industry. In the next section, this article will explore the prospects of VT, particularly with the COVID-19 pandemic travel restrictions being lifted.

XI. FUTURE PROSPECTS OF VIRTUAL TOURISM

In recent years, virtual tourism, formerly confined to science fiction and experimental technology, has positioned itself at the crossroads of technical breakthroughs and changing travel behaviours. Virtual tourism allows travellers to experience a destination without physically leaving their homes. Because of our growing reliance on technology for communication, business, and leisure activities, the capacity of the digital landscape to take us to faraway places without requiring us to leave the convenience of our homes is becoming increasingly apparent. Not only do the prospects for the future of virtual tourism promise to improve the quality of the digital travel experience, but they also promise to bring about significant shifts in how we understand and interact with tourism in general. The ongoing development of technology that enables virtual reality (VR) and augmented reality (AR) presents an exciting and potentially lucrative opportunity. Both have made significant progress over the past ten years, transitioning from cumbersome devices and pixelated experiences to more immersive worlds that are portrayed in high resolution. Virtual travellers should anticipate progressively more realistic and interactive digital adventures as hardware grows more refined and software becomes more advanced. In the future, virtual reality (VR) and augmented reality (AR) platforms may deliver experiences that are startlingly similar to the actual thing when combined with technologies that imitate touch and feel (Anwar & Hamilton, 2005).

In addition, incorporating artificial intelligence (AI) into virtual tourism platforms paves the way for a future in which each tour will be customised to the individual's preferences. Imagine a virtual tour that adjusts itself in real-time, making recommendations for routes, activities, or areas of interest based on a person's past travel experiences, preferences that they have specified, or even their current state of mind. These platforms have the potential to deliver highly individualised experiences thanks to the power of machine learning; this would transform virtual tourism from a static viewing experience into an adaptable trip. There are also critical environmental repercussions to consider when engaging in virtual tourism. As talks worldwide shift towards more environmentally responsible behaviours, limiting the carbon footprint left by overseas travel is more important than ever. Virtual tourism is an alternative that is better for the environment, which is especially helpful for long-distance trips and places that tourists are overrunning. As virtual platforms grow more commonplace, we may witness a conscious shift in which tourists visit ecologically fragile regions virtually rather than in person to protect the areas' physical integrity for future generations. The scalability of virtual tourism presents venues with an opportunity to diversify their revenue streams from an economic perspective. Even though there is ongoing discussion on which type of tourism is more beneficial to the economy, virtual tourism presents an opportunity to connect with previously unreachable audiences owing to financial, geographical, or political barriers (Verkerk, 2022). Destinations can tap into worldwide audiences and generate cash by monetizing exclusive virtual experiences like live-streamed events or interactive cultural workshops.

This allows destinations to avoid the load on their infrastructure from hosting physical tourists. From a sociocultural point of view, virtual tourism could help create a better understanding and empathy among people worldwide. It is possible to contribute to a more connected and harmonious global community by allowing people worldwide to study and comprehend the history, cultures, and narratives of various places without requiring them to leave their homes. Virtual exchanges may supplement these tours, which would be made possible by innovative telecommunication platforms and make it possible for individuals from different regions of the world to communicate, discuss, and share information in real time (Verkerk, 2022). Despite the potential improvements that could result, obstacles still need to be overcome. It is essential to strike a healthy balance between online and offline tourism. As technology makes the latter more enticing, cultural commodification is potentially risky. This is how complex customs and histories are condensed into digital objects that may be sold. In addition, persons who depend excessively on virtual experiences may be dissuaded from seeking out connections with others in the actual world, inhibiting both personal development and genuine comprehension of other cultures. The opportunities for virtual tourism in the future are broad and multi-faceted, entwining the progression of technology with the shifting social norms and behaviours of different societies. As with any transformation, the journey will require intelligent navigation to ensure that technology augments, rather than reduces, the natural human drive to discover, interact with, and understand the world around us. It seems like good things are on the horizon, and if we approach the future of virtual travel with the right balance of enthusiasm and caution, it just might change how we think about the world and where we stand in it (Zirbes, 2021).

This section discussed the prospects of VT leveraged by innovative technology and AI tools; VT has raised the benchmark for the Tourism industry and has rekindled lucrative global business opportunities through real-life experiences and haptic reality. Concerns expressed by UNWTO (2012) about sustainability support VT. Exploitation and unwarranted economic development can be effectively managed with VT strategies for the tourists, thus retaining important social, cultural and heritage artifacts for future generations. The following section recommends an urgent need to promote VT and 'controlled' traditional tourism to safeguard revenue streams and reduce social and environmental repercussions.

XII. RECOMMENDATIONS FOR VIRTUAL TOURISM STAKEHOLDERS

Virtual tourism has established itself as a modern, forward-thinking, and readily available alternative to conventional forms of travel in this age of information and communication technology. As it begins to fit into the larger tourist framework, it becomes urgent for the many stakeholders to hone their tactics to use its full potential. This endeavour necessitates an in-depth investigation into optimising virtual experiences, establishing the necessary training and infrastructure, and synchronising the symbiotic relationship between virtual and real tourism. By addressing these core issues, stakeholders may be given the ability to facilitate the development of a resilient and environmentally responsible tourism paradigm in the future (Bec et al., 2021).

Optimising Virtual Tourism Experiences: The sincerity and depth of the experiences that virtual tourism may provide are the primary factors that give it gravitas. This means that locations and organisations will need to create virtual experiences that are not just visually appealing but also highly engaging in order to compete. Through high-resolution images, 360-degree panoramas, and augmented reality, it is feasible to reproduce scenes virtually identical to the actual thing. Audio narratives infused with historical, cultural, and socio-anthropological aspects can complement visual narratives to deepen the user's immersion. Nevertheless, beyond the scope of simple representation, it is of the utmost importance to provide universal accessibility. When designing virtual platforms, keeping a wide range of user groups, including people with impairments, in mind is important. The incorporation of user feedback systems can provide essential insights, enabling continuous refining and ensuring that user needs are prioritised throughout the creation of virtual experiences. The ease with which digital content can be corrupted makes developing a robust code of ethics necessary. This would ensure that virtual portrayals do not idealise or misrepresent the reality of the locations, maintaining an ethical picture of the depicted places (Zejda & Zejda, 2016).

Training and Infrastructure Development: The speed with which technology advances highlights the need for the tourism business to maintain its commitment to ongoing education and training. Participants in the virtual tourism industry should prioritise training programmes that emphasise the art of digital storytelling, expertise in virtual reality and augmented reality software, and the curation of digital information. This not only guarantees quality but also makes room for creativity in the development of virtual tour layouts. Regarding infrastructure,

money should be directed towards purchasing cutting-edge equipment such as drones for aerial photos, high-definition cameras for ground views, and powerful virtual reality headsets for user experiences. The infrastructure on the back end is also of equal importance. It is necessary to have reliable servers and cloud solutions to provide uninterrupted user experiences, particularly during high user volume. The implementation of artificial intelligence and machine learning can be sped up through collaborations with industry heavyweights, resulting in virtual tours that are both more personalised and dynamic. Because of the nature of the digital sphere, cybersecurity ought to be paramount. To ensure user trust and data integrity, non-negotiable components should include strong firewalls, encrypted data transport, and frequent security assessments (Lo & Cheng, 2020).

Striking a Balance between Virtual and Physical Tourism: Even though virtual tourism provides access unmatched by conventional tourism, it is crucial to remember that its purpose is to supplement the traditional form of tourism rather than replace it. Virtual encounters have the potential to serve as catalysts, igniting curiosity and driving visitors to make actual trips. They can also allow alternative access during peak seasons or to ecologically susceptible locations, controlling visitor flow and decreasing environmental strain. This is especially useful in areas where there are both peak seasons and ecologically vulnerable areas. This concept can greatly assist important archaeological locations or have delicate ecosystems, as it strikes a tight balance between visitor interest and preservation imperatives. However, in order to maintain this equilibrium, stakeholders need to communicate openly with one another. They need to clarify the value proposition of both traditional and virtual tourism, urging tourists to consider virtual tourism not as a substitute for traditional tourism but as an enriching supplement (Yang et al., 2023).

Enhancing Interactivity and User Engagement: One of the possible drawbacks of virtual travel is the increased likelihood of engaging in passive content consumption. To solve this problem, stakeholders need to innovate beyond traditional linear experiences. Incorporating interactive components, such as quizzes, digital puzzles, or gamified modules, can engage users more profoundly. Users using interactive platforms might be able to "choose their adventure," influencing the course of their virtual travel based on their choices when taking a tour. This dynamic model improves user engagement and makes it easier for users to return to the website multiple times, as their individual experiences might vary depending on their selections (Merkx & Nawijn, 2021).

Collaborative Synergies: Virtual tours can get a sense of authenticity and depth if created with local craftspeople, historians, or cultural specialists. These collaborations can take many forms, such as developing elaborate digital recreations of historical events told by local historians or creating virtual artisanal workshops where users can learn how to make traditional crafts. These kinds of activities not only boost the socio-cultural benefits of virtual tourism but also have the potential to function as an indirect driver of traditional tourism. After conversing online with a community member, a tourist may feel motivated to visit the area in person, resulting in increased economic activity and cultural interaction within the community (Cheng & Huang, 2022).

Crisis Management and Virtual Tourism: The international environment is uncertain, with causes such as pandemics, political turmoil, or natural disasters occasionally preventing people from physically travelling to different locations. Participants in the virtual tourist industry must be ready to pivot during such moments, providing customers with augmented or specialised virtual experiences. This maintains interest in the impacted destinations and provides an alternate cash stream when traditional tourism is experiencing a slowdown (Ogbeide, 2020).

Evaluative Metrics and Feedback Loops: Success criteria for virtual tourism should be created and tracked with the same rigour as physical tourism. Stakeholders must use analytics tools to evaluate user engagement, interaction depth, and feedback. Surveying consumers regularly can provide insights into which components of the virtual experience resonate the most with them and which areas require further development (Marasco, 2020).

Ethical Considerations and Representation: As with any portrayal, there is an inherent responsibility to guarantee fairness and authenticity in any portrayal. "Digital exoticism" is an overly romanticised or stereotypical representation of a culture or location, and it is something that virtual tourism should steer clear of. In order to guarantee that their image is courteous, truthful, and nuanced, stakeholders are required to connect

with local populations. In a globalised society that is becoming increasingly sensitive to cultural misappropriation, this ethical commitment ensures the sustainability of virtual tourism (Jamal & Lee, 2021).

Future Horizon: The field of technology is constantly undergoing new developments. Introducing new technologies such as haptic feedback, which virtually recreates the sensation of touch, has the potential to revolutionise virtual tourism further. All relevant parties should maintain a heightened awareness of developments of this kind and work to incorporate them into their operations as soon as they are practical to provide multi-sensory, immersive experiences. Many stakeholders face a diverse set of opportunities as well as problems presented by virtual tourism. It paves the way for a future in travel that is sustainable, inclusive, and democratic when it is successfully optimised, complemented with appropriate training and infrastructure, and balanced with traditional tourism. This progression is evidence of both the progression of technology and the adaptability of the tourism industry. The industry currently finds itself at a crossroads as the gap between virtual and real-world experiences continues to close. Stakeholders may ensure that virtual tourism improves the whole travel domain by combining innovation, collaboration, ethics, and foresight, emphasising inclusivity, authenticity, sustainability, and participation as the primary goals of the endeavour (Hsu, 2018).

The following recommendations for VT are presented from the above discussions on prospects and UNWTO's concerns. A comprehensive approach to harnessing the full potential of this innovative technology-based VT is recommended as a modern travel alternative. This includes optimizing virtual experiences by ensuring authenticity, accessibility, and ethical representation. Additionally, investing in training and cutting-edge infrastructure is crucial for delivering high-quality virtual tours. Next, balancing virtual and physical tourism is essential, with virtual encounters acting as catalysts for actual trips. Enhancing interactivity and user engagement through innovative features like quizzes and gamified modules can create more dynamic experiences. Collaborative synergies with local experts and artisans add depth and authenticity to virtual tours. VT recommendations, crisis management strategies, evaluative metrics, ethical considerations, and feedback loops ensure resilience in uncertain times. Finally, staying attuned to technological advancements, such as haptic feedback, further promises to revolutionize the virtual tourism landscape. The industry stakeholders could consider these recommendations that can usher in a future of travel that is sustainable, inclusive, and technologically immersive, ultimately enriching the global tourism experience.

XIII. CONCLUSION

This paper examines how technology has changed the travel and tourism industry into a Virtual Tourism dimension. Contemporary information in this research demonstrated new dimensions of virtual tourism, leveraged by innovative technologies and changing customer behaviour. Virtual travel has grown from a niche interest in the 1990s to a popular trend, as discovered in this research.

The paper sought to understand the demand factors for VT and its impact on satisfaction. Therefore, two (2) research questions were developed to seek (i) how the demand for VT is impacted by its determinants and (ii) how the forms of VT impact the satisfaction level for VT. To test, hypotheses were developed and research designed. Next, the hypothesis was developed, and research design and data collection methods were considered. Quantitative and qualitative approaches are based on surveys, interviews, and case studies. Ten cases offered real-world examples supported by a wealth of qualitative data sources. These case studies also aligned with the research questions, enabling rigorous exploration. Finally, the findings from both these methodologies indicated that The demand for VT is impacted by determinants such as technology and education and their satisfaction level for VT. At the same time, qualitative findings demonstrated different points of view, highlighting the idea that virtual tourism complements traditional travel experiences rather than replacing them. The main topics are how people's views on virtual travel change, the pros and cons of technology used, and the crucial issues of data privacy and sustainability. The paper stresses the importance of virtual tourism to learn and an environmentally friendly way to travel. Overall, the study provided an extensive picture of virtual tourism as a changing mix of technology and personal events in the post-pandemic and technology era.

The paper's findings discovered several other determinants as well. For instance, the paper also confirmed that the demographic profile of the age group between the ages of 25 and 34 is significant and that they are technology-oriented using primary VR tools like Google Earth V.R. Additionally, the section on Key Concepts and Technologies in Virtual Tourism showed that certain age groups, especially those when examined with the Virtual Tourism Case Studies, demonstrated the significant incidents of success and expected technology

challenges coupled with issues of privacy, ethics and cybersecurity. Broadly, the paper concluded that Virtual Tourism has more advantages than limitations. Limitations and concerns, namely, technical glitches, data privacy issues, and the environmental impact. The research also considered prospects of VT that shed light on the several potential paths for expansion, utilising shared virtual experiences to integrate augmented reality solutions. However, the effectiveness of VT can be achieved if stakeholders prioritize the engagement of VT. Finally, the paper recommends a comprehensive stakeholder outline, highlighting the importance of collaboration, technological advancement, and ethical deliberation.

This research paper has made inroads into undiscovered areas of VT, but it requires further research to explore demand determinants of VT and satisfaction level of VT as new technologies and application tools are introduced, expounding real-world and real-time tourism experience. To encapsulate, virtual tourism represents a remarkable technological advancement and a manifestation of the dynamic connection between travel and the digital interconnectedness prevalent in our society. The potential of this technology is extensive, as it can connect individuals across different geographical locations and provide unprecedented personal experiences that were previously inconceivable. Nevertheless, adopting a well-rounded strategy encompassing technology advancements and ethical issues is imperative while ensuring environmental sustainability. The expanding landscape of virtual tourism invites stakeholders, travellers, and academics to actively participate, investigate, and ascertain that this virtual journey aligns with the unique and irreplaceable experience of physical travel.

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BIOGRAPHIES AND PHOTOGRAPHS

Short biographies (120-150 words) should be provided that detail the authors' education, work histories, and research interests. The authors' names are italicised. Small (3.5 X 4.8 cm), black-and-white pictures/digitised images of the authors can be included.

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