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# THE ROLE OF COVID-19 ON SUSTAINABILITY IN THE TOURISM INDUSTRY THROUGH GREEN MARKETING PERSPECTIVE AND A CONCEPTUAL MODEL PROPOSAL ON VIRTUAL REALITY TOURISM

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## ABSTRACT

Environmental issues, recently, have become one of the most pressing problems of the world that require immediate attention. Due to the growing awareness of the threats posed by environmental issues, there has been a shift in consumer focus toward environmental concerns. As an emerging alternative to support environmental sustainability, virtual reality tourism has shown signs of increased activity, according to recent research on sustainability and green tourism. The aim of the paper is to examine the link between sustainability and virtual reality tourism. While contributing to the literature on virtual reality tourism for sustainability, the concept of sustainability and green marketing is discussed in the paper with reference to the tourism industry and virtual reality (VR). In this context, the ability of virtual experiences to be seen as a substitute for traditional tourism and the impact of crisis situations such as COVID-19 on that potential is examined, and a conceptual model is demonstrated. Two tendencies getting attention during the pandemic: 'Environmental Awareness' and 'Immersive Technology Usage' are proposed in the conceptual model as the drivers of 'Perceived Usefulness' and 'Behavioral Intent' of VR tourism as a sustainable option. The paper is important and contributes to literature both in theory and practice by focusing on VR at the interface of tourism, marketing, and sustainability by its environment and technology focus.

**Keywords:** Green marketing, green tourism, sustainability, virtual reality tourism, COVID-19, tourism industry

Doi: 10.15659/ppad.16.1. 1216931

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Geliş Tarihi / Received: 09.12.2022, Kabul Tarihi / Accepted: 20.01.2023

## YEŐİL PAZARLAMA BAĐLAMINDA COVID-19'UN TURİZM ENDÜSTRİSİNDE SÜRDÜRÜLEBİLİRLİK ÜZERİNDEKİ ROLÜ VE SANAL GERÇEKLIK TURİZMİNE YÖNELİK KAVRAMSAL BİR MODEL ÖNERİŐİ

### ÖZ

Çevre sorunları, günümüzün en önemli sorunlardan biri haline gelmiştir. Bu sorunların oluşturduğu tehditlere ilişkin artan farkındalık nedeniyle, tüketici odağında çevresel kaygılara doğru bir eğilim görülmektedir. Bu bağlamda, yakın zamanda gerçekleştirilen sürdürülebilirlik ve yeşil turizm alanlarındaki arařtırmalara göre, sanal gerçeklik turizmi çevreye duyarlı bir alternatif olarak artan bir ilgiyle karşılanmaktadır. Bu makalede, sürdürülebilirlik ve yeşil pazarlama kavramları sanal gerçeklik ve turizm endüstrisi temelinde ele alınarak, tüketicilerin sürdürülebilirlik için sanal gerçeklik turizmine yönelik niyetlerine ilişkin literatürün genişletilmesi amaçlanmıştır. Bu bağlamda, sanal deneyimlerin geleneksel turizmin yerini alma potansiyeli ve COVID-19 gibi kriz durumlarının bu potansiyel üzerindeki etkisine değinilerek kavramsal bir model ortaya konulmuştur. Kavramsal modelde, sanal gerçeklik kullanımının artmasında, "Tüketicilerin Çevresel Farkındalığı" ile "Sanal Teknolojinin Kullanıcılarca Kabulü" iki önemli faktör olarak önerilmiştir. Pandemi ile dikkat çeken iki eğilim, sürdürülebilir bir seçenek olarak VR turizmine ilişkin "Algılanan Yararlılık" ve "Davranışsal Niyet" değişkenlerinin itici güçleri olarak kavramsal modelde yer almıştır. Bu çerçevede, çalışma sanal gerçeklik turizmine odaklanarak turizm, pazarlama ve sürdürülebilirlik arakesitinde literatüre teorik ve pratik katkılar sunması bakımından önemlidir.

**Anahtar Kelimeler:** Yeşil pazarlama, yeşil turizm, sürdürülebilirlik, sanal gerçeklik turizmi, COVID-19, turizm sektörü

## 1. Introduction

While technology advances to further surround human life in numerous areas, it becomes a prime suspect in issues that threaten the ecology by contributing to global warming and the release of greenhouse gases. In order to provide a solution along with a sustainable lifestyle, there is an ongoing attempt to create awareness with an expectation to trigger a behavioral change on both supply and demand side. As sustainability is mentioned in all disciplines, marketing literature discusses the issue at the individual, organizational and environmental levels. The paper focuses on green marketing in terms of sustainable tourism and the role of technology (Virtual Reality). In the intersection of tourism, sustainability, and virtual reality, Covid-19 is mentioned as an important fact that affects both technology usage and the environmental awareness of individuals.

From this point of view, sustainability is one of the main issues of the tourism industry. Tourism, as a part of the service industry, has had far-reaching effects on the environment as a result of its rapid growth in recent years. According to Zhao and Li (2018), the environmental impacts of tourism are widespread and include pollution derived from transportation, destruction of the original landscape, and excessive energy use by tourism facilities. To reduce the tourism industry's detrimental impact on the environment, tourists must adopt more environmentally friendly practices (Gossling et al., 2021).

With the emergence of the COVID-19 outbreak and the significant advancements in technology, people's perceptions of Virtual Reality in tourism have transformed from a gimmick to a legitimate form of alternative travel option (Debusmann, 2020). According to Zhang et al. (2022), the extant literature agrees with the general public's optimistic view of virtual tourism during times of crisis like COVID-19, and it confirms that visitors' sentiments toward virtual tourism decrease when it coexists with traditional tourism. Despite this decrease, virtual reality still has great potential in the tourism industry from the perspective of green tourism and sustainability (Rousseau and Deschacht, 2020; Bhattacharya and Stern, 2020). The environmental awareness and sensitivity (Monteiro et al., 2021) of the consumers and the user acceptance of virtual technology (Godovykh et al., 2022) are two important drivers for the increase of VR tourism usage as a sustainable option.

This paper aims to expand the literature on VR tourism usage for sustainability. Through a comprehensive, holistic view, it is also aimed to underline the importance of VR tourism for sustainability by emphasizing the role of the pandemic in the adoption of VR in the tourism industry. This attempt is valuable for tourism, marketing, innovation, and sustainability disciplines both in theory and practice. Besides, the study highlights the effects of COVID-19 on the perceived usefulness of VR tourism within the framework of sustainable tourism through two drivers: 'environmental awareness' and 'immersive technology usage.' The

paper contributes to sustainable tourism through the integration of environment and technology-based dimensions of VR Tourism that is driven by COVID-19.

Firstly, the concept of sustainability and green marketing is discussed in the scope of the tourism industry. In the following part, immersive technologies and the concepts of VR, AR, and metaverse are examined. Finally, virtual tourism as an emerging industry within the framework of sustainability is discussed. Considering the perspectives of previous studies, a conceptual model is proposed, and the paper is concluded with the implications for the sustainable tourism industry.

## **2. Sustainability and Green Marketing**

United Nations defines sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” (United Nations Academic Impact, 2022). This definition offers a suitable starting point for a comprehensive grasp of this abstract concept. While many countries are looking for ways to meet their development needs, responsible actions must be taken to make sure that development today doesn’t affect future generations in a negative way. According to Portney (2015), sustainability can be achieved only by simultaneously protecting the environment, preserving economic growth and development, and promoting equity.

Within the perspective of environmental sustainability, the American Marketing Association (AMA) (2022) defines green marketing as the organizational efforts to produce, promote, package, and reclaim products with ecological considerations. Similarly, according to Groening et al. (2018), “green marketing” includes a range of marketing activities (like price, planning, process, production, promotion, and people) that highlight the company’s goal to make its products and services less harmful to the environment. Bukhari (2011) also mentions that “green marketing”, which refers to the marketing practices that have a smaller negative impact on the natural environment, has emerged as a topic of conversation in recent years, and businesses are working actively to discover the most effective ways to communicate their green values to consumers.

Parallel to sustainability and green marketing trends, today, individuals care more about saving the environment and are changing their behavior to reflect this care by taking action. Due to the growing awareness of the threats posed by environmental issues, there has been a shift in consumer focus toward environmental concerns, and people are starting to think more about the potential global influence of their purchasing behavior (Jones et al., 2014; Bukhari, 2011; García-Salirrosas and Rondon-Eusebio, 2022).

While there is a growing market for green, sustainable, and socially responsible products and services, green marketing literature (Kinoti, 2011; Chan, 2013; Sharma, 2021; Sugandini et al., 2020) is also growing in the scope of “sustainable purchasing” as a realized action of this trend. In recent literature, “purchasing

behavior” has been defined from two different angles (García-Salirrosas and Rondon-Eusebio, 2022). One school of thought holds that consumers should give preference to “green” products, meaning those that aren’t harmful to the environment and are made, used, and discarded in accordance with regulations. Second, as part of what is known as “purchasing ethics”, consumers should consider their own level of self-awareness and sense of social responsibility. Consumers that share this goal are looking for options that will allow them to meet their needs while having as little of an effect on the planet as possible.

On the business side, Papadas et al. (2019) underline the role of green marketing in gaining a competitive advantage by operating green. Being green in operations also improves the company’s image, which can result in higher revenues and more devoted customers. In addition to these advantages, by releasing environmentally friendly products and services, businesses may not only meet the demands of customers who are already concerned about the environment but also provide others the chance to develop that concern and awareness (Lu et al., 2013). Thanks to the ongoing environment-friendly trend in consumer behavior, more and more businesses recognize their obligation to protect the environment. In order to achieve sustainable development, organizations should take measures to reduce the amount of damage they do to the environment through their operations (García-Salirrosas and Rondon-Eusebio, 2022).

Along with the ongoing trends, some sudden realities such as COVID-19 were voiced as a critical fact that created a mindset change as rethinking and awareness of the environment and sustainability issues (Tauber and Bausch, 2022). In that manner following part of the paper examines COVID-19 and sustainability in tourism through a specific perspective on green marketing: “green tourism”.

### **3. COVID-19 and Sustainability in Tourism Industry**

#### **3.1. Tourism Industry and COVID-19**

Tourism is one of the biggest contributors to the global economy and employment, and many countries in the world also rely on tourism for their economic growth and sustenance (Mohanty et al., 2020). It is extremely sensitive to both external and internal shocks, as demonstrated by the fact such as COVID-19 outbreak (Gürsoy et al., 2022; Saseanu et al., 2020), which led to shutdowns of several activities and facilities such as accommodation, establishments, restaurants, airlines, malls, shops, sports events, concerts. As a result of the travel restrictions applied all around the world during the pandemic, tourism activities have been damaged severely due to the dramatic decrease in tourism revenues. For instance, because of the pandemic, the number of international passengers decreased by 60% in comparison to 2019, and the aviation sector has lost approximately 370 billion dollars due to the decrease in the number of passenger transportation via airlines (Monteiro et al., 2021).

Therefore, economic difficulties, worldwide experienced environmental catastrophes, and climate change issues are increasingly being taken into account, making the creation of sustainable tourism increasingly important, especially following the COVID-19 outbreak (Jones and Comfort, 2020). Tourism has had far-reaching consequences on the environment due to its rapid growth in recent years and an increased demand following the COVID-19 lockdown. Despite having a wide-ranging impact on the natural world, the tourism industry is beyond other sectors when it comes to sustainability measures (Orındaru et al., 2021). Kıřla et al. (2022) state that some research findings and current developments point to the tourism recovery being at the forefront of global efforts in the post-COVID age, and as a result, new discourses have been arising. *Health and hygiene, demand evolution, innovation and digitalization, and sustainability* are the four primary topics highlighted by World Tourism and Travel Council (WTTC) (2022).

### 3.2. Green Tourism As A Sustainable Way of Tourism

The United Nations World Tourism Organization (UNWTO) (2022) defines sustainable tourism as “*tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment, and host communities.*” Here, UNWTO places a strong emphasis on the economic, social, and environmental factors of sustainability. Sustainability in tourism has been the subject of heated debate in the literature (Saseanu et al., 2020) and examined by a variety of disciplines in 14 different subject areas listed by Zolfani et al. (2015): paradigm, sustainable business development, market research and economics, policy-making, infrastructure, modeling and planning, rural tourism, environment and crisis management, ecosystem and eco-tourism, climate change, ecology, culture and heritage, human resource management, energy and material savings, and waste reduction.

Meler and Ham (2012) state that there is a growing consensus that countries looking to grow their tourism industry must prioritize sustainability, and “green tourism” is mentioned as another concept in the literature. While the term “green tourism” is often used by businesses to refer to holidays that are friendly to the environment, international organizations adopt a meaning that is more in line with sustainable tourism. UNWTO (2022) describes “green tourism” as a form of sustainable tourism that safeguards the natural environment, makes use of the resources provided by the local community, and reduces the amount of damage done to the environment. The discussions on the negative effects of tourism on the environment have raised awareness of the issue and prompted people to make greener purchasing decisions (Gosling et al., 2021; Srivastava et al., 2021). Recent research has demonstrated that carbon dioxide emissions from transportation have a considerable impact on the overall level of pollution in the environment (Gosling et al., 2021).

The ongoing discussions about the detrimental effects that tourism has on the natural world have caused an increasing number of people to make purchases that

are considered environmentally friendly. In this way, due to the intense interactions of tourism with the natural environment, the actors in the tourism industry need to demonstrate a high interest in ensuring a sustainable way of tourism that minimizes its detrimental influence on the natural environment (Chen, 2020; Schiopu et al., 2021). People's pro-environmental actions are driven by their awareness of personal actions that contribute to environmental degradation (Tam, 2019). This understanding then motivates people to take action that is just as careful with the environment (Han et al., 2015; Shin et al., 2018).

In the COVID-19 pandemic, both the lack of options for physical tourism and customers' awareness of nature and the environment appear as an increasing number of people are opting for virtual reality (VR) tourism instead of in-situ travel. In fact, consumers that are still worried about the impact of the pandemic consider virtual reality tourism as an eco-friendly alternative to traditional vacations (Saseanu et al., 2020). The following part of the paper gives detailed information about technology and VR and its usage in tourism.

#### **4. Diverse Immersive Technologies and Virtual Tourism**

##### **4.1. Immersive Technology, VR, AR, and Metaverse**

Technology is reshaping the tourism industry as well as all other fields and offers some opportunities to breed in the future, such as immersive media, which can be defined as innovative media that evoke the user's sense of being there (Perkis et al., 2020; Verma et al., 2022). Immersive technology is defined as the technology that blurs the boundary between the physical and virtual worlds and enables users to experience a sense of immersion (Lee et al., 2013). In other words, users are emplaced in a technology-driven environment with the possibility to actively partake and participate in the information and experiences dispensed by the generated world (Perkis, et.al, 2020). As the pinnacle of the virtual world, "immersive media" places the user in the center of the digital experience. Immersive technology is distinguished by its ability to provide a convincing illusion of physical presence (Rosenberg, 2022). In its pure spirit, virtual tourism facilitates a tourism experience without traveling (Neuburger et al., 2018; Wei, 2019). Virtual Reality (VR) and Augmented Reality (AR) are the cornerstones of immersive media. The terms virtual reality and augmented reality have been used since the end of the 1980s and the beginning of the 1990s, respectively.

##### *Virtual Reality*

The term "Virtual Reality" (VR) describes a computer-simulated, immersive, interactive, and first-person environment that gives the viewer a powerful sense of being there. The participants' visual, auditory, tactile, aromatic, and gustatory senses are all aroused in such an environment. Virtual reality is defined by Helsel and Roth (1991) as a reality or a real event that is essentially like this but is not in reality. Virtual reality software generates an artificial setting that mimics the real

world to a significant level in many respects (including sight, sound, touch, etc.). VR technology allows users to create an immersive experience that fools their senses into thinking they're in the real world. Spectators get the impression that they are actually there, and users can interact with virtual environments and carry on discussions as if they were in the same place (Li, 2017).

### *Augmented Reality*

“Augmented reality” (AR) is a word for a technology that uses computer-generated material to overlay the real world and enables real-time interaction. Real-world remains central, but virtual elements are added for variety (Rosenberg, 2022). The difference between VR and AR is whether or not the user has a sense of being physically there. In virtual reality, the user is entirely immersed in a simulated environment; in augmented reality, the user is immersed in a world that combines real and simulated elements (Yung and Khoo-Lattimore, 2019; Mohanty et al., 2020; Verma et al., 2022).

### *Metaverse*

On the other hand, the metaverse is another immersive technology that became wildly popular, largely due to Facebook changing its name to Meta (Gürsoy et al., 2022). The term metaverse is the combination of the prefix “meta” (beyond) and the suffix “-verse” (shorthand for the universe), and it refers to a computer-generated world, while “metaverse tourism” is a new type of virtual tourism that offers a service or experience of shared spatial contexts that is augmented by multisensory information processing at the convergence of real and digital worlds. Interacting with metaverse environments might enhance tourists' experiences with a tourism destination or product (Go and Kang, 2022).

## **4.2. Virtual Tourism As An Emerging Value in Tourism Industry**

Despite the fact that the concept of sustainable tourism has been extensively covered in the literature (Zolfani, 2015), it is noted that the effects of technology on the growth of sustainable tourism have been ignored. Therefore, the implementation of augmented reality and virtual reality within the context of sustainable development of tourism has received little attention. In fact, the proliferation of digital technologies profoundly impacts people's ways of living, working, traveling, and conducting business. The tourism industry has made great use of virtual tourist activities as a result of the proliferation of internet usage and the advancements in related technology. As a direct result of people's participation in virtual experiences, their preconceptions regarding the foreseeable future of technology and the possible reactions of the hospitality and tourism industries have undergone a significant transformation (Buhalis and Karatay, 2022). In this paper, VR is considered an emerging value in the market both as a new experience and as a new way to support the environment for sustainability for the sake of individuals and the other actors in the tourism industry. As a promise to sustainable



tourism, these two sakes for VR Tourism are the focus of the paper, and they are reflected in the conceptual model. Some critics in the literature are mentioned in the following lines.

#### *VR Tourism As A New Value for New Experience*

Although virtual reality (VR) is not a new topic due to the rapid change in technology in recent years, it is rapidly gaining ground in the tourism industry as well as other fields (Kim et al., 2021; Makransky et al., 2019). So, virtual reality is fast being exploited not merely as a vehicle for the promotion of tourism but also as a tourist destination itself. When framed in this way, VR becomes a travel option that actively encourages exploration. One could easily assume that in the not-too-distant future, virtual tourism will evolve and eventually fulfill the aspirations of some vacationers for unique experiences. As well as recent research (Kim et al., 2021; Lu et al., 2022) in early researches, virtual tourism, according to some academics, has given rise to a new kind of travel that provides many advantages (Cho et al., 2002; Guttentag, 2010). It has been discussed and assumed that the experience that tourists will have in the future will increasingly be a combination of reality and virtual reality, which will allow it to better comply with sustainability criteria (Dewailly, 1999). Virtual tourism is considered a time saver and provides a cheaper experience while preserving the natural environment, as well as giving the opportunity to access to closed or inaccessible destinations of the past and even the future (Sussmann and Vanhegan, 2000). Enhancing 'virtual accessibility' is stressed as another new experience and value of VR Tourism, especially for the elderly and disabled with limited mobility (Lue et al., 2022).

#### *VR Tourism As A New Value for Environment*

Virtual tourism is an important tool when it comes to the protection of the natural world. Bin et al. (2021) state that virtual tourism helps reduce emissions by lowering travel frequency and preserving nature by reducing ecological footprints. Besides, on the issue of virtual tourism and its advantages for heritage sites, Hobson and Williams (1995) state that VR potentially could function to preserve heritage by providing an alternative form of access to threatened sites. In parallel, today, virtual tourism is considered as the possibility of restoring a destination to its original historical look, safeguarding cultural heritage, and easing of travel for people with special needs and disabled tourists (Yung and Khoo-Lattimore, 2019). Similarly, Lu et al. (2022) mentioned the advantages of virtual tourism in reducing unnecessary greenhouse gas emissions from transportation and enhancing 'virtual accessibility,' especially for the elderly and disabled with limited mobility.

#### *Critics on VR Tourism*

Despite the advantages listed above, some skeptics claim that tourists can't have a satisfying virtual trip since they need to interact with the real world (Kim et

al., 2020). It is also a concern of some heritage destination administrators that the virtual experience may water down the destination's objective authenticity, so they refuse to implement this strategy (Dueholm and Smed, 2014). Besides, Onciou and Priescu (2022) state that this emerging technology is mostly preferred by generation Z, and most people are not used to these new technology tools. However, even for this group of people, one of the most important things for VR to reach its full potential is also to incorporate things that can be touched or felt. Furthermore, according to Polcar and Horejsi (2015), highly immersive virtual reality applications are known to cause motion sickness symptoms.

While discussions are going on about the positive and negative effects of virtual reality as an emerging product in the market, the following part of the paper highlights the role of VR in the recovery of nature and its direct contribution to the environment and sustainable tourism.

### **5. Virtual Reality for Recovery of Nature and Sustainable Tourism**

Due to its nature, the tourism industry has contributed to the decrease of natural and protected places, as Spenceley et al. (2017) pointed out. It has either directly caused habitat loss and land-use change or indirectly caused a cumulative change and contributed to climate change through the introduction of alien species (Hall, 2022). Referring to the tourism industry's growing carbon footprint, which has become a significant contributor to ecological imbalances, Wolf et al. (2021) argue that policymakers should prioritize adopting green practices to boost resilience and ensure the long-term sustainability of the evolving tourism sector. Digital solutions that help reduce emissions by lowering travel frequency are increasingly being accepted as a replacement for unsustainable physical activities (Bin et al. 2021). In this manner, virtual reality (VR) technology is considered to promote ecological sustainability and benefit sustainable tourism (Srivastava et al. 2021). While the importance of environmentally responsible behavior (ERB) for the long-term success of tourist destinations and sustainability is mentioned in the literature (Su et al., 2020), there is an attempt in order to decrease the negative effects of tourism on nature and there is growing interest in studying how virtual reality might be used not just as a promotional tool (An et al., 2021) but also as an alternative to physically visiting highly delicate ecosystems (Filter et al., 2020, Glenn, 2021).

From this perspective, virtual reality tourism is a viable and environmentally friendly option (Yung and Khoo-Lattimore, 2017). Go and Kang (2022) suggest a new approach to sustainable tourism in which metaverse/VR tourism products and experiences are used in line with sustainable development goals. In another research (Talwar et al., 2022), individuals' pro-environmental acts are motivated by their understanding of the consequences of their actions that promote ecological damage. By understanding the link between their actions and the environmental impacts they cause, people are more likely to take precautions to safeguard the

planet. Talwar et al. (2022) argue that consumers' concern for the environment is correlated positively with their attitude toward virtual reality tourism. Moreover, customers' shifting perspectives on environmental issues may even entice them to enjoy the hospitality and tourism industry's offerings in virtual reality or the metaverse while decreasing their impact on the environment and saving resources. These potential shifts in consumer behavior underline the need for industry efforts to produce and offer genuine hospitality and tourism experiences in virtual reality when the required technology becomes available and user acceptance grows (Gürsoy et al., 2022).

In parallel to VR and sustainable tourism research, the effects of COVID-19 on tourism and the "post-pandemic" tourist system have examined the extent to which digital and virtual tourism may play a significant role in addressing the difficulties and its ability to result in a sustainable transition (Akhtar et al., 2021; Lu et al., 2022). When the pandemic is considered as a recovery of nature, it is seen that without visitors during the COVID-19 lockdown, cities like Venice and Los Angeles were able to quickly restore their water and air quality (Clifford, 2020; Hewitt, 2021). While previous sustainable tourism measures in these regions may not have been adequate to mitigate negative environmental consequences, this extreme case may demonstrate how a substantially reduced number of tourists might help filthy tourism hotspots recover. Referring to that recovery in a different part of the world, it is possible to say that tourists are more concerned with "short-term self-related benefits" than they are with "long-term oriented sustainability concerns" (Tasci, 2017). It may not be enough to rely on the goodwill of visitors to mitigate the effects of over-tourism when it persists and threatens sustainable tourism. According to Go and Kang (2022), the global pandemic has provided a once-in-a-generation chance to examine how heavily reduced travel has affected polluting tourist hotspots and to reevaluate pressing sustainable development concerns.

Additional to that recovery process, the worry experienced due to the COVID-19 is expected to influence the mentality of tourists and their future decision-making (Crossley, 2020; Tauber and Bausch, 2022). The recent literature shows that environment-related awareness of the public is increased due to the COVID-19 pandemic since individuals had the chance to experience how the reduced mobility positively affected the environment (Rousseau and Deschacht, 2020; Acungil and Acungil, 2022; Go and Kang, 2022). Besides, according to Oncioiu and Priescu (2022), the pandemic has provided a one-of-a-kind opportunity to evaluate the impact of extremely low travel on polluted tourist destinations and to reconsider existing sustainable development concerns. Another recent study (O'Connor and Assaker, 2021) has verified the indirect effect of COVID-19 risk perception on pro-environmental travel behavior via a willingness to make financial sacrifices for environmental protection, environmental duty, environmental moral obligation, and environmental concerns. Besides the increased environmental sensitivity,

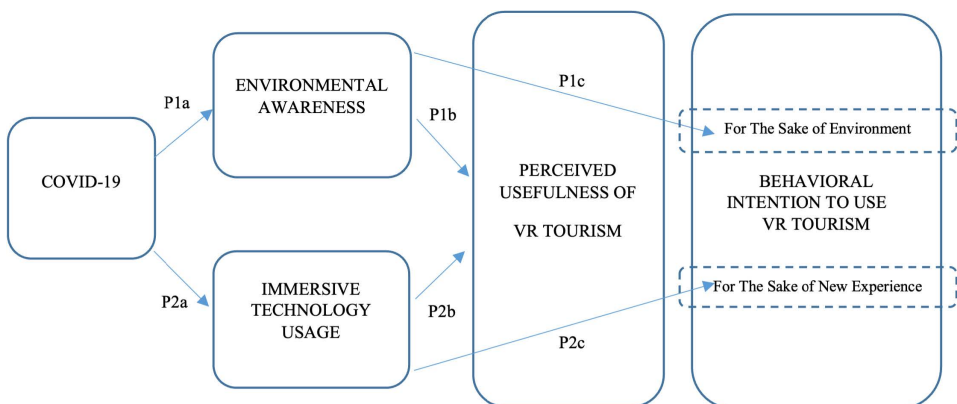
with the technological developments in virtual tourism, people are more willing to forego the hedonic pleasure and happiness that can only be gained through traveling to these locations in person (Talwar et al., 2022).

## 6. Conceptual Model: The Role of COVID-19 on VR Tourism

As mentioned in the paper, travelers' outlooks, priorities, and decisions in the tourism industry have all been impacted by the COVID-19 public health catastrophe. Due to the limits on travel, many individuals stayed at home throughout the outbreak, and the growing popularity of digital technology and the development of immersive technologies such as metaverse and VR offered a viable replacement for traditional tourism. People took advantage of virtual tourism technologies to either digitally visit previously visited locations or to explore new locations without creating direct damage to the environment.

In light of the literature on the link between COVID-19, virtual reality tourism, and sustainability, a conceptual model is proposed. The relation model represents the link between COVID-19 and its effects on environmental awareness and new technology usage, which are seen as the main determiner of VR Tourism. As discussed in the previous part of the paper, lack of mobility due to COVID-19 has two important effects. The first one realizes the importance of nature and the environment and the second one is the requirement to use more technology than before the pandemic. These two essential outcomes of COVID-19 are proposed as the antecedent of VR tourism acceptance. VR Tourism acceptance is demonstrated by referring to Technology Acceptance Model (Davis, 1989) using the variables perception (Perceived Usefulness) and intent (Behavioral Intent).

Figure. 1 shows the proposed conceptual model and the research propositions are explained in the following paragraphs.



**Figure 1.** The Conceptual Model: The Role of COVID-19 on Acceptance of VR Tourism

### **6.1. Perceived Usefulness of VR Tourism and Behavioral Intention**

As discussed in the paper, VR tourism is stressed as a way of sustainable tourism, considering VR Tourism as a new technology-based experience and referring to the Technology Acceptance Model: TAM (Davis, 1989). In the conceptual model that is proposed in this paper, perceived usefulness (PU) is defined as a significant factor in behavioral intentions (BI), as mentioned by other researchers (Davis, 1989; Hart and Porter, 2004; Fagan et al., 2012; Kemp et al., 2022).

### **6.2. Environmental Awareness**

As stated before, Go and Kang (2022) believe that the global pandemic presents a once-in-a-generation chance to reevaluate sustainable development concerns and assess the impact of traffic on polluting tourist destinations. Virtual tourism contributes to the sustainability of tourism by expanding tourism experiences without increasing direct contact or the human footprint in preserved habitats and resources. COVID-19 helped to improve the sustainability of the world in terms of the environment (increased health, lower pollution, less harmful production processes, lower harmful touristic activities, etc.). With COVID-19 restrictions on the environment, the consumers' environmental sensitivity and the pandemic's impacts on future travel choices of potential visitors, with a particular emphasis on the environmentally sustainable dimension, have increased (Monteiro et al., 2021). Consumers who worry about the environmental damage generated by their travel see virtual reality (VR) tourism favorably as an environmentally-friendly alternative to conventional tourism that takes place in situ. It is believed that customers' concern for the environment is associated positively with their attitude toward virtual reality tourism. Due to the increased awareness of environmental issues, environmentally sensitive customers are ready to give up the pleasure and delight provided by traditional tourism and keep on using virtual reality tourism opportunities to sate their cravings even after the COVID-19 outbreak has ended (Talwar et al., 2022).

Based on research into the relationship among virtual reality tourism, environmental sustainability and the impact of the COVID-19 outbreak on consumer behavior, it can be concluded that restrictions imposed during the pandemic prompted people to reflect on and take action regarding environmental issues and sustainability with a growing sense of eco-guilt after they realize that many significant locations make environmental recoveries during the restrictions of the pandemic period (Crossley, 2020; Talwar et al., 2022). In other word pandemic affected the environmental awareness and sensitivity of travelers positively. Talwar et al. (2022) confirm the relationship that the concern for the environment arouses a positive attitude toward VR, which translates into a willingness to make personal sacrifices to engage in pro-environmental behavior even after the pandemic is over.

*Proposition 1a: Restrictions of COVID-19 positively affected the environmental awareness of individuals*

*Proposition 1b: Environmental awareness positively affects the perceived usefulness of VR Tourism*

*Proposition 1c: Environmental awareness positively affects behavioral intention to use VR Tourism*

### **6.3. Immersive Technology Usage**

From this perspective, we can say that with COVID-19 restrictions, more people started to use and became more and more interested in alternative immersive technologies (Filter et al., 2020; Gürsoy et al., 2022), which increased the user acceptance of VR technologies. Besides VR technologies, other immersive technology usage has increased during the pandemic. New technologies (immersive) increase people's sensation of presence in virtual environments. Immersed users feel more connected to the virtual than the real world. Sagnier et al. (2020) state that the sensation of presence has a positive effect on the intention to use virtual reality. Thus, as the sensation of presence increases with technological developments, many people turn to previously unexplored virtual-reality tools to satisfy their wanderlust to travel, and this shift in user behavior has contributed to a rise in the popularity of cutting-edge immersive technologies.

Due to COVID-19, the general public's opinion of virtual tourism appears to be trending in a positive direction, as reported by Sarkady et al. (2021) and Zhang et al. (2022). Since COVID-19 caused many tourist attractions to go down in an attempt to control the outbreak, visitors had much less to do in remote areas. Although the demand for tourism was high, virtual tourism initiatives were able to satisfy it by providing a novel experience, which was well received by visitors (Cho et al., 2002). Supporting the perspective of Hobson and Williams (1995) that virtual tourism provides an effective alternative when an on-site destination is inaccessible, it can replace on-site tourism during times of crisis. Elkhwesky et al. (2022) state that virtual tourism enables tourists to have an immersive experience by exploring and engaging with the envisioned environment while providing a risk-free option to travel safely and comfortably.

*Proposition 2a: Restrictions of COVID-19 positively affected the usage of immersive technologies*

*Proposition 2b: The usage of immersive technologies positively affects the perceived usefulness and acceptance of VR Tourism*

*Proposition 2c: The usage of immersive technologies positively affects behavioral intention to use VR Tourism*

### **6.4. Future Research Agenda for Proposed Model**

While the paper proposed a model based on the current literature, measuring the role of environmental awareness and immersive technology usage in VR

acceptance has the potential to contribute to the literature in terms of motivations for VR Tourism. In order to understand the role of COVID-19 on the factors demonstrated as the antecedent of acceptance of VR, future researchers may generate a questionnaire to demonstrate the difference between the perception of the users on environmental awareness and immersive technology usage before and after COVID-19. Additionally, future researchers could develop the model in order to understand the motivations of VR Tourism usage in terms of two perspectives and sake: “VR Tourism for a new experience”, and “VR Tourism for the environment” and their relationship with hedonic and utilitarian behaviors. Besides, when VR Tourism is considered an emerging value and linked with innovative consumption, individual innovativeness could be added to the model. Also, the following research can extend the model by adding demographic factors as well as cultural factors.

## 7. Conclusion and Implications

This paper aims to expand the literature on VR tourism for sustainability while the concept of sustainability and green marketing is discussed, referring to the tourism industry and virtual reality. In this context, the ability of virtual experiences to be seen as a substitute for traditional tourism, the impact of crisis situations such as COVID-19 on that potential is examined, and a conceptual model is demonstrated. In the model, two tendencies getting attention of the pandemic: ‘Environmental Awareness’ and ‘Immersive Technology Usage’ is proposed in the conceptual model as the drivers of ‘Perceived Usefulness’ and ‘Behavioral Intent’ of VR tourism as a sustainable option.

Through its comprehensive, holistic perspective, the paper underlines the importance of VR tourism for sustainability and emphasizes the role of the pandemic in the adoption of VR in the tourism industry. Based on the paper, some practical and theoretical future potentials and contributions are listed for: Tourism, Marketing, Innovation, and Sustainability:

1. The tourism industry, as a leading industry actively using VR by the masses, has the potential to expand acceptance of VR in other industries as well as expanding its own industry.
2. Production and consumption practices of VR Tourism in different concepts appear as emerging subjects in marketing and tourism literature, such as new markets created by the pandemic, traces of the pandemic in consumer behavior, and adoption of innovation.
3. In the scope of adoption of innovation, VR Tourism is a special case that gained acceptance during the pandemic, and it is still on the agenda post-pandemic. The role of extraordinary facts on the acceptance of innovation can be considered for other industries and products as well. The role of environmental awareness in the acceptance of innovation can be another issue that can be searched in the

scope of innovation and its legitimacy in the market.

4. Acceptance of VR Tourism has an environmental sustainability promise in other industries as well as tourism. Since as a locomotive industry, tourism practices have a close link with other industries that cause carbon footprint due to the transportation activities such as education, sports, art, and cultural events. Tourism has the potential to be a model to other industries in VR usage and contribute to sustainability.

Referring to these four areas, it is believed that VR will be discussed more in the future, and this paper is valuable to contribute to the literature by highlighting the role of VR Tourism in a holistic and comprehensive view.

In terms of the practical side, as it is stressed in the previous parts of the paper, in the tourism industry, travelers' outlooks, priorities, and decisions have all been impacted by the COVID-19 pandemic. Due to the limits on travel, many individuals stayed at home throughout the outbreak, and the growing popularity of digital technology and the development of new immersive technologies such as metaverse and wearable gadgets offered a viable replacement for traditional vacationing. People took advantage of virtual tourism technologies to digitally visit previously visited places or explore new places without directly harming the environment. Recent papers (Chen, 2020; Schiopu et al., 2021) indicate that VR tourism is a viable, sustainable alternative to traditional tourism that is swiftly gaining market popularity. Besides being an alternative during the outbreak, in some papers (Talwar et al., 2022), it is argued as a first option for some customers, referring to the willingness to experience VR tourism as a new way of tourism. The desire of consumers to use virtual reality tourism in post-pandemic as well as the pandemic is interpreted as a call to invest in VR and transfer this desire into actual behavior.

It can be suggested that governments and travel organizations should seek to capitalize on these continued VR tourism ambitions in order to reduce the environmental effects of in-situ tourism. Additionally, virtual reality tourism can be used to ensure the long-term viability of cultural and historical sites, which often crumble in the face of excessive visitor numbers (Frey and Briviba, 2021). Increasing the satisfaction of VR users is a step in this direction, as it will likely lead to loyalty, continued interest, and the use of virtual tourism.

The pandemic made people more interested in VR tourism and created an emerging market, which gives VR tourism businesses a chance to expand their network of loyal customers long after the pandemic has ended. Managers can make the most of this opportunity by firmly promoting VR tourism to groups of people who would benefit most from it (those who cannot afford in-situ travel, those who are physically unable to travel, and those who are highly motivated by concerns about their eco-footprints) (Fennell, 2021). To achieve these goals, messages promoting



virtual reality tourism should highlight its usefulness as a new experience and its positive effects on the environment. As a result, virtual reality businesses would have a reliable customer base on which to build and maintain their commercial success as a part of a sustainable environment.

Expanding tourism experiences without increasing direct contact or the human footprint in preserved ecosystems and resources is one method by which virtual tourism could help the sustainability of tourism and strengthen the resilience of tourist locations. Destinations could see a rise in revenue if they take measures to protect their natural resources and capitalize on the growing market for virtual tourism products and experiences that can be enjoyed from afar. For future generations of vacationers, especially, the use of virtual reality at tourist hotspots and cultural monuments may pave the way for really altering travel experiences (Buhalis and Karatay, 2022).

In the scope of practical perspective, there are simultaneous benefits of VR in pandemic and post-pandemic both for individuals, organizers, destinations, and nature. For further studies, surveys can be conducted to analyze and test the proposed model on the perception of virtual tourism as a sustainable option. Additional research on other levels of analysis, such as the meso level (for example, organizational level - tourism service providers) or the macro level (according to different countries) is necessary to fully understand the effect of COVID-19 on the perception of VR tourism as a sustainable alternative and strengthen the literature around this important topic.

By means of the proposed model and future implications listed above, the paper is important and contributes literature both in theory and practice by focusing on VR at the interface of tourism, marketing, and sustainability.

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