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DESTINATIONS, VIRTUAL REALITY AND COVID-19. HOW ISOLATION HAS SHAPED THE BEHAVIOURS AND ATTITUDES TOWARDS VR

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ABSTRACT. Virtual Reality (VR) has been a research subject since the 1990s. Subsequently, the possibilities of applying this technology to various industries have been a subject of debates. While the tourism industry has not been an exception, a marked increase in interest is a recent phenomenon. One of the reasons for this is the unexpected pandemic that, in a way, has forced the tourism industry to search for alternative ways of communicating destinations and reducing the distance between destinations and tourists. The uncertainty of the situation and the change in tourist behaviour as an effect of COVID-19 have prompted the search for new tools to interact with tourists and influence their decisions. The new circumstances might also influence how people evaluate VR tools. The main aim of this paper is thus to diagnose the attitudes and behaviours towards VR during isolation, as well as to present their possible implications for destinations. The research results show that VR has the potential to extend the boundaries of tourism and destinations' activities, and COVID-19 has played a role in shaping people's attitudes and behaviours towards VR.

JEL Classification: O33, Z32 ***Keywords***: virtual reality, VR, tourism, destinations, COVID-19

Introduction

SARS-CoV-2 (COVID-19), originating from the Chinese city of Wuhan in China, discovered in December 2019, was declared a pandemic by the WHO on March 11, 2020. Since then, four waves of the pandemic have been recorded with 258,457,605 confirmed cases and 5,163,506 deaths globally (John Hopkins COVID-19 Resource Center, 2021).

COVID-19 is the biggest pandemic of the 21st century, with catastrophic consequences in almost all areas of life and economic sectors (Fernandes, 2020; McKibbin and Fernando, 2020). National and international travel restrictions in many countries have affected over 90% of the world populations and wrecked both national economies and the tourism industry (Gössling et al. 2020). Travel and tourism (T&T) are expected to be the industries hit the hardest, with respect to both the demand and the supply of tourism products (UNWTO, 2020a).

One of the main consequences of the SARS-CoV-2 pandemic is a change in people's lifestyles, including mobility and new preferences.

The tourism industry has to learn to cope with these new realities (Yung and Khoo-Lattimore, 2019) and search for solutions to meet the new type of demand. Virtual tours have been considered as one option of keeping the interest in destinations alive as well as "an alternative escapism helping people get entertainment to forget stressful and nauseating realities. People could enjoy the sensation of vacation without leaving their home" (Rastati, 2020, p. 491). During the pandemic, the supply of virtual tours seems to have increased. In the case of museums, 2,500 can be visited virtually at the moment (Bishara, 2020). According to Rastati (2020), virtual tours can be a starting point for alternative tourism during the COVID-19 time and even after the pandemic. Moreover, there are people "who do not have the resources, economic capacity, spare time, and access, so they can taste the sensation of recreation via a virtual tour" (p. 493).

Virtual reality (VR) can become therefore an alternative for people who cannot take a vacation temporarily due to COVID-19, but also a means of promoting tourist destinations, a tool with the potential of boosting tourist visits after the COVID-19 pandemic. It bodes very well in a situation where the actual experience becomes difficult to enjoy (Lee and Kim, 2021).

Recently, many researchers have explored the benefits of VR in the tourism context. From a tourist's point of view, the main benefits of VR include entertainment (Guttentag, 2010), accessibility, tourism experience enhancement, and availability of images and information (Williams and Hobson 1995, Guttentag, 2010).

The main goal of this paper is to diagnose the attitudes and behaviours towards VR during COVID-19. The research is a part of a broader project which aims at finding the model of non-immersive VR's influence on the attitudes of tourists towards the destination brands in the pandemic, based on the Technology Acceptance Model introduced by Davis (1989). However, a separate set of statements was prepared to investigate a wider VR context, therefore the research procedure and the resulting data allowed to observe specifically the attitudes and behaviours towards VR in general, towards VR in tourism, and VR during isolation caused by COVID-19, as well as indicate some differences according to the group's characteristics.

The data were collected between 4 and 21 October 2021 using an online questionnaire on people with any kind of experience with the VR technology (e.g. gaming) via Facebook tourism groups (in total 74 groups and 7 forums were approached with global and regional scopes). While collecting the data, in most cases FB banned posts that invited to responding to the survey (with only 8 groups and 2 forums left) therefore the Amazon Mechanical Turk platform was used to complete the research sample. As a result, the sampling size was 386 (391 questionnaires were collected but 5 were eliminated as incomplete) and included respondents from 40 countries.

1. Consequences of Covid-19 for tourism and destinations

In the event of epidemics, the tools to stop the spread of the disease include isolation and lockdowns, quarantine and social distancing. During COVID-19, travel agencies and airline companies have cancelled trips to and from the affected areas; special airport restrictions and control procedures were implemented for foreigners (Schiopu et al. 2021); events like music concerts, film festivals, sports competitions and conferences, were cancelled, hotels and restaurants were closed and tourist attractions were shut down (Rastati, 2020). To control and curtail the spread of the disease, many governments banned international travel and imposed nation-wide lockdowns. Ultimately, during the pandemic peaks, most destinations were closed for tourists. Although the tourism industry has experienced many crises over the past decade like terrorist attacks and natural disasters, it was during the COVID-19 pandemic when almost

all countries closed their borders and did not accept visitors in order to stop the spread of the virus. This led to very low or no mobility (Uğur and Akbıyık, 2020) and as a consequence, the tourism and hospitality industry has been one of most affected. The decline was essential, especially considering the increased possibilities of new technologies usage, particularly, AI wearables (Sułkowski and Kaczorowska-Spychalska, 2021) and e-business tools with its numerous advantages for the sales growth in these spheres before the pandemic (Roshchyk et al., 2022). Some of new technologies created advanced opportunities for leisure, being available regardless the age (Podhorecka et al., 2021). The outbreak of COVID-19 has had an enormous impact on the global tourism industry, not only due to travel restrictions but also because of a natural decrease in demand for travelling. The perceived risk to travel in times of crisis is one of the most important factors in the decision-making process to travel in general as well as to choose a specific destination (Garg, 2015; Sarkady et al., 2021). A decision is considered risky when its consequences are negative, undesirable or uncertain in comparison with other options (Roehl and Fesenmaier, 1992), and if tourists perceive travel as dangerous or unpleasant due to actual or perceived risks, they are willing to change their choices (Korstanje, 2009). Tourists' anxiety and uncertainty are becoming major challenges not only during health crises like COVID-19 but also long afterwards which harms the tourism industry even more.

In many countries, tourism is an important source of income and jobs. Globally, in 2019 the T&T sector contributed 10.4% to the global GDP (US$9.2 trillion). International visitor spending amounted to US$1.7 trillion in 2019 (6.8% of total exports, 27.4% of global services exports (WTTC, 2021). Due to COVID-19, it is estimated that international tourist arrivals fell by 73% globally in 2020 (against 2019) and by 85% in 2021 (data till May 2021) (UNWTOb, 2020). According to Statista (2021), due to the pandemic, the global leisure travel spend decreased by 49.4% in 2020 over the previous year, reaching 2.37 trillion U.S. dollars, whereas in 2019 it amounted to roughly 4.69 trillion U.S. dollars. The global GDP share decreased to 5.5% in 2020 due to the restrictions to mobility (WTTC, 2021).

The unprecedented COVID-19 pandemic has posed extreme challenges to the hospitality and tourism industry. A report published by the World Tourism Organization (2020, citied in Atsız, 2021), investigating the influence of COVID-19 on international tourism, noted that the situation had created also some opportunities for destinations in terms of innovation and digitalization. In the pandemic, but also in a post-COVID-19 world, there has been a growing need for use of technology to engage visitors through web-mediated virtual information, providing vicarious experiences of destinations, garnering interest, and evoking positive emotions toward tourist attractions (Yung et al. 2021). In May 2020, the UNWTO recognized virtual reality among innovative solutions for the recovery of tourism from COVID-19. "We now have an opportunity to rethink tourism and do things better. Virtual reality, artificial intelligence, and big data will all have a part to play in our joint response to COVID-19, and in building resilience for the future" (UNWTO, citied in Atsız, 2021).

Paradoxically, the pandemic is therefore seen as a chance for destinations to improve their offer via a wide range of technological travel tools such as VR (Kwok and Koh, 2020). Specifically, tourism destinations and businesses can use these travel tools to reduce stress, worries and concerns of tourists desiring to visit their destination (Guttentag, 2010; Yang et al. 2021). VR enables users to travel virtually, using computer-generated images or videos, simulating real-life experiences and offering a travel alternative (Guttentag, 2010; Loureiro et al. 2020).

More advanced forms of VR technology allow users to enjoy a realistic tourism experience in their desired location. Therefore, some authors consider VR tourism as a powerful tool in overcoming the limits of tourism's intangibility since consumers have the opportunity to experience tourist attractions or destinations in advance of their visit (Lee and Kim, 2021) or

instead of visiting a destination (Sarkady et al. 2021), also because of the latest travel restrictions (Rogers, 2020).

Although research emphasizes the role of VR in various destinations or types of tourism, the upsurge in using these technologies in the post this disaster is expected to increase in the future (Mora, 2020). It was more than 25 years ago, when Williams and Hobson (1995) stated that "from a marketing perspective, VR has the potential to revolutionize the promotion and selling of tourism" (p. 425). The newest research results proved that VR increases attachment and visit intention (Kim et al., 2020) as well as impulsive desires for a destination (Kang, 2020). Cheong (1995) posited that using VR to compare different destinations helps consumers make informed decisions, and Li and Chen (2019) indicated that the perceived enjoyment of VR mediates the effect of the perceived ease of use and the perceived usefulness of VR on travel intention. Few studies have examined if VR is capable of replacing the travel to a destination itself. Guttentag (2010) suggested examining the factors that influence people's perceptions of a 360◦ virtual tour as a substitute for tourism experience. Sussmann and Vanhegan (2000) tested if tourists perceive VR as a complement to actual travel. The results suggested that the respondents did not perceive VR as a real holiday replacement, and similar conclusions were provided by Prideuax (2005).

However, in the changed circumstances, it is predicted that virtual travels will increase in the post-COVID-19 era. Travel companies will offer their services via virtual marketing before the trial of experience and destination will promote their attractions via VR (Atsız, 2021). VR technology can be used to reduce the barrier of the distance between potential tourists and the destination (Leung at al., 2020).

In this context, a growth in the potential of VR and AR (artificial reality) in tourism has been noted. Their value was calculated at US$ 74.6 million in 2018 and is expected to reach US$ 304.4 million by 2023, growing at a Compound Annual Growth Rate (CAGR) of 32.5% (All the Research, 2020). This growth of the AR VR in the travel and tourism ecosystem is primarily attributed to the increasing demand for travel and tourism.

2. Virtual reality

VR can be defined as an artificial environment which is experienced through sensory stimuli (such as sights and sounds) provided by a computer and in which one's actions partially determine what happens in the environment (merriam-webster.com). Due to numerous recent publications, VR may seem to be a relatively new phenomenon, yet the conceptual manifestations of virtual reality have existed since the late 1920s (i.e. The Link "Blue Box" Trainer Flight Simulator (McFadden, 2018), while Thompson (2017) took the birth of virtual reality back to stereoscopes invented in the mid-19th century. Undoubtedly, the VR history is richer than one might think and since the introduction of one of the latest devices i.e. Oculus Rift to the market in 2016, many different companies (e.g. Sony and Microsoft) have developed their own VR solutions recognizing the potential of the technology. The VR market is projected to grow from USD 3.7b in 2016 to USD 16.3b in 2022 (Statista, 2016, cited in Yung et al., 2021). According to data from "Virtual Reality – Thematic Research", a report by GlobalData Thematic Research, by 2030 VR will become a 28 billion $ market (GlobalData Technology, 2020). This forecast is in line with the ever-growing interest in VR that is widely adapted across various industries (Mandal, 2013).

The thematic scope of publications on VR is very broad as well, including the army (Lele, 2013; Pallavicini et al., 2016), medicine (Székely and Satava, 1999; Goo et al., 2020), sport (Neumann et al., 2018; Kim and Ko, 2019), marketing (Barnes, 2016; Wedel et al., 2020), education (Radianti et al., 2020; Helsel, 1992), gaming (Rendon et al., 2012; Viitanen et al., 2018), tourism (Schiopu et al., 2021; Flavián et al., 2021) etc. Recently, tourism has been

drawing relatively the biggest interest, mainly due to the worldwide COVID-19 restrictions in the sector. This variety of publications undoubtedly leads to numerous inaccuracies in defining VR. Therefore criticism of overstretching the term has arisen (Laurel, 2016), accompanied by a call to unify the existing definitions (Kardong-Edgren et al., 2019). For the purpose of this paper, we define VR as "A computer-generated display that allows or compels the user (or users) to have a sense of being present in an environment other than the one they are actually in and to interact with that environment" (Schroeder, 1996). Nevertheless, it should be noted that there exist VR definitions which emphasize the immersive nature and the possibility of using additional devices simulating the virtual environment, e.g. "A computer-generated reality, which allows a learner or group of learners to experience various auditory and visual stimuli. This reality can be experienced through the use of specialized ear- and eyewear." (INACSL Standards Committee, 2016) or "A computer-generated three-dimensional environment that gives an immersion effect" (Lopreiato et.al., 2016).

One of the most important factors which distinguishes VR systems from traditional media (such as the radio and television) is its three -dimensional structure. Immersion, presence and interactivity are described as peculiar features of VR (Mandal, 2013), oftentimes becoming also separate subjects of research on the subject e.g. VR presence (Schuemie et al., 2001), VR immersion (Bowman and McMahan, 2007), VR interactivity (Bailenson et al., 2008). According to Slater (2018) "VR systems can be classified by the extent to which one system can be used to simulate another" i.e. based on the level of immersion. Ideally, a VR system should perceptually surround the participant (i.e. work on all the user's senses). As Mandal (2013) rightly noticed, "the practice is very different from this ideal case and many applications stimulate only one or a few of the senses, very often with low-quality and unsynchronized information". In general, based on the level of immersion, VR systems can be classified into three groups (Mandal, 2013; Riva, 2006; Bamodu, Ye, 2013; Buttussi, Chittaro, 2017):

- Non-Immersive (Desktop VR) systems represent a lower level of immersive VR and do not require any special devices to be employed in many applications. Sometimes referred to as Window on World (WoW) systems, this is the simplest type of virtual reality applications in which a computer user views a virtual environment through one or more computer screens. Interaction with that environment is possible, but a user is not immersed in it. Only a conventional monitor/or screen to display the image of the world is required (another sensory output is not supported).
- Semi-Immersive (Fish Tank VR) systems – an improved version of the Non-Immersive systems. Supporting head tracking, these systems improve the sense of presence. A conventional monitor (very often with LCD shutter glasses for stereoscopic viewing) is a part of the system and generally, sensory output is not supported.
- Immersive systems – they can be viewed as the ultimate version of VR systems. Therefore the user can be totally immersed in the virtual world with the help of dedicated devices like HMD, supporting a stereoscopic view of the scene according to the user's position and orientation. These systems are expandable by audio, haptic and sensory interfaces.

For comparison purposes, Isdale (1998) provided a less synthetic approach to the VR systems classification, distinguishing six solutions where the major distinction of VR systems is the mode with which they interface with the user: 1. Window on World Systems (WoW); 2. Video Mapping; 3. Immersive Systems; 4. Telepresence; 5. Mixed Reality; 6. Fish Tank Virtual Reality.

In general, there is a widespread use of VR in tourism (Beck et al., 2019) and research on the topic is relatively diverse including immersive (Israel et al., 2019; Wu et al., 2021) and non-immersive solutions (Bastanlar, 2007; Disztinger et al., 2017) alike. Starting from 2020, a

clear increase in interest in this subject has also been noted which is definitely related to the outbreak of the COVID-19 pandemic (e.g. Bec et al., 2021; Schiopu et al., 2021; Li et al., 2021).

3. Research results

In the research process, the respondents were asked to refer to a number of statements (the 7-point Likert scale was used) which can be categorized into 5 areas:

1) experience with VR, the perceived ease of use and the perceived use enjoyment of VR (based on statements developed by Singh, 2020; Sarkady, Neuburger, Egger, 2021; Wachyuni, Kusumaningrum, 2020; Statista.com, 2016; Schiopu et al., 2021; Disztinger, Schlögl Groth, 2017; Buhalis, 1998; Hong, Thong, Tam, 2006), the perceived ease of use category is borrowed directly from the original TAM model;
2) the perceived usefulness of VR in tourism (based on statements developed by Schiopu et al., 2021, Disztinger, Schlögl Groth, 2017, Buhalis, 1998), the perceived usefulness category is borrowed directly from the original TAM model;
3) the attitude towards VR (based on statements proposed by Statista.com, 2016 and added by authors),
4) usage of VR tools during COVID-19 and the attitude towards VR tools in a pandemic (based on statements developed by Singh, 2020; Sarkady, Neuburger, Egger, 2021; Statista.com, 2016), the usage behaviour category is borrowed directly from the original TAM model;
5) behavioural intentions (based on statements developed by Schiopu et al., 2021, Disztinger, Schlögl Groth, 2017 and added by the authors).

The respondents were also asked to specify their gender, age, nationality (categorised later according to the world region due to 40 identified nationalities), education level, marital status, the way of working during the pandemic (online, face to face, hybrid) and travel experience during COVID-19 (see *Table 1* for sample characteristics).

The authors' intension was to analyse the perception of VR among average users, therefore the technological issues were not the subject of the discussion. As indicated above, the statements used were confirmed in previous research, and only some were added by the authors as a consequence of TAM model extension.

Non-parametric tests (i.e. the Mann-Whitney U test and the non-parametric H Kruskal-Wallis test) were used to identify statistically significant differences in the results of the study. These kinds of tests are used when the dependent variable is measured by an ordinal scale e.g. a Likert scale. The description below contains only statistically significant differences. In the description of the results, it was assumed that:

- a positive rating (PR) refers to the sum of the percentage of positive responses from 5 to 7 on a Likert scale *(where: 5 - Somewhat Agree, 6 – Agree, 7 - Strongly Agree)*
- negative rating (NR) refers to the sum of the percentage of negative responses from 1 to 3 on a Likert scale *(where: 1 - Strongly Disagree, 2 – Disagree, 3 - Somewhat Disagree)*

Table 1. Sample characteristics, N=386

Characteristics	Percentage of overall answers
GENDER	
Female	42.5
Male	54.4
Refuse to answer	1.8
REGION	
Asia	18.9
Europe	27.7
USA	42.2
others	6.2
AGE	
18-25	27.7
26-35	39.9
36-45	21.0
46-55	6.5
Over 55	4.7
MARITAL STATUS	
Married	57.3
Single	40.9
EDUCATION LEVEL	
Master or above	29.3
Bachelor	49.0
Engineer	7.8
Secondary	11.7
Primary or below	1.6
WAY OF WORKING DURING COVID-19	
Fully online	60.9
Hybrid	19.2
Face to Face only	9.1
Combination of the above	10.1
TRAVEL BEHAVIOUR IN THE PANDEMIC	
I have travelled during the pandemic	69.2
I have not travelled during the pandemic	30.6
I am planning to travel during the pandemic	72.0
I am not planning to travel during the pandemic	27.2

Source: *own research*

3.1. Experience with VR, the perceived ease of use and the perceived VR use enjoyment

Almost half of the respondents previously used VR for gaming (48.4%) while tourism became the second largest group (22%), followed by marketing purposes (9.1%). In the "other" category, single mentions referred to the army, arts, entertainment, maps, and films (*Figure 1*).

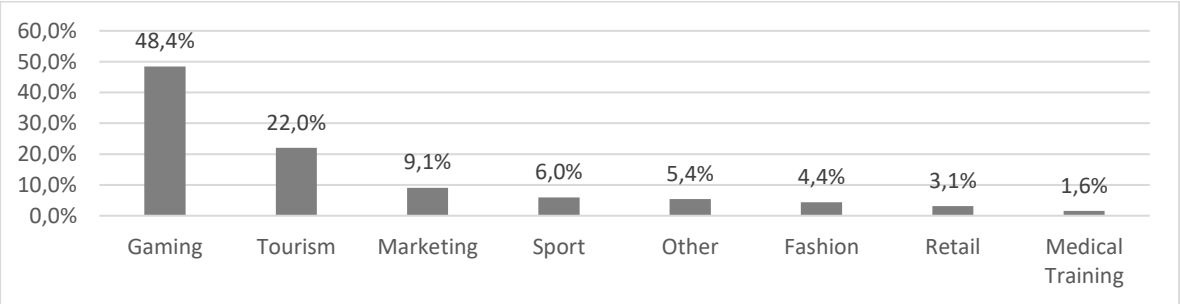

Figure 1. The respondents' experience with VR according to industry type (in %)
Source: *own data*

A majority of the respondents agreed that interacting with VR is clear and easy to understand (83.9% positive rating). The results of the Mann-Whitney U test indicate significant statistical differences between married and single respondents (U=15423,5, p<0,05); the married respondents found understanding of VR easier. It should be also noted that the results of the non-parametric H Kruskal-Wallis test confirmed the existence of statistically significant differences in relation to age (H4,390=13,621; p<0.05) and region (H2,348=12,370; p<0.05). The older the respondents, the more VR is perceived as complicated. The group with the least problems were people aged between 26 and 45. As for the regions, the respondents in the United States (89% PR) have the least problems with understanding of VR, followed by Asia (81.1% PR) and Europe (76.6% PR).

Similarly, the respondents found it easy to learn to operate VR (77.5% PR). However in terms of gender (U= 15171,5, p<0.05), males (80.5% PR) found it easier to learn and operate it than females (75% PR). Additional differences have been found in relation to the educational level ($H_{4,389}$=11,011; p<0.05) and the age of the researched group ($H_{2,390}$=12,062; p<0.05). Engineers were a group of respondents with the most positive opinion (86.7% PR), followed by people with primary or lower education (83.3% PR) and bachelor degrees (77.8%). Taking into account the age, the most positive group regarding the ease of VR operating were people aged 26 to 35 (80.5%), and the least positive group were people aged 46 to 55 (64% PR).

In general, the respondents found VR easy to use (80.8% PR to 8.5% NR, there were no statistically significant differences according to the results of the non-parametric tests). The results of the study also indicate that using VR is enjoyable (87.8 PR) and the differences depended on the level of education ($H_{4,389}$=9,956; p<0.05), age ($H_{4,390}$=11,605; p<0.05) and the employment status ($H_{2,348}$=7,126; p<0.05) of the respondents. The group of respondents who least enjoy using VR are people with the highest education, i.e. master's degree and above (78.8% PR), while all the other groups showed a positive attitude above the average. As for the age of the respondents, the younger the person, the greater the enjoyment of VR (from 91.6% PR for respondents aged 18-25, to 72.2% for respondents aged over 55). Interesting conclusions have also been drawn about VR enjoyment, taking into account the employment status of the respondents during the pandemic. People working face to face rated VR enjoyment higher (94.3% PR), while people working online rated it below the average (85.1% PR). In the view of the above results, it is not surprising that the respondents think of VR as fun (85.7% PR) with differences depending on their level of education ($H_{4,389}$=12,628; p<0.05) and employment status ($H_{2,348}$=9,650; p<0.05). Generally speaking, engineers had an above average ratio of perceiving VR as fun (93.3% PR i.e. highest ratio in the criterion), while those with the highest education showed a below-average ratio (81.4% PR i.e. the lowest ratio in the criterion). In terms of the nature of work, the group of people working in the hybrid system saw VR as the most fun (92.9% PR). Similarly, it is not surprising that respondents agreed with the statement that using VR is pleasant (80.8% PR to 8.0% NR, there were no statistically significant differences according to the results of non-parametric tests).

3.2. The perceived usefulness of VR in tourism

When it comes to using VR applications in tourism, a majority of the respondents see it as a good idea (84% PR) and think it is useful for travel planning (79.8% PR). Differences should be noted according to marital status (U=15748,50, p<0,05; U=15875,50, p<0.05) and the level of education ($H_{4,389}$=14,616; p<0.05; $H_{4,389}$=14,570; p<0.05). Married respondents in both cases rated these aspects of VR higher than singles (88.4% PR to 77% PR and 82.6% PR to 75.8% PR). Engineers, similarly, in both cases rated them the highest (90% PR and 90% PR) in relation to the other groups. The respondents think that VR offers access to accurate and reliable information about destinations at a fraction of the cost, time and effort compared to

traditional promotional material (74.9% PR). Depending on the marital status (U=15808,50, p<0.05), married respondents were more positive towards that statement than singles (78.1% PR to 68.3% PR).

More than half of the respondents disagree with the statement that VR in tourism is a bad idea (52.8% NR to 36.1% PR). Notably, differences have been found with regard to all the analysed factors i.e. gender (U=14716,50, p<0.05), marital status (U=12817,50, p<0.05), level of education ($H_{4,389}$=10,205; p<0.05), age ($H_{4,390}$=23,513; p<0.05), employment status ($H_{2,348}$=25,771; p<0.05) and region ($H_{2,348}$=50,835; p<0.05). Therefore, women tended to disagree with this statement much more than men (63.4% NR to 46.2% NR) and if they did, they were less positive about it then men (28,7% PR to 41% PR). Similarly, singles showed differences in relation to the question in relation to married respondents (66.5% NR to 43.3% NR and 21.7% PR to 45.1% PR). In the case of the respondents' education, the group of engineers was the most positive about the statement (53.3% PR). On the other end of the spectrum were people with the highest (61.9% NR) and secondary education (64.4% NR). People aged 36-45 (69.1% NR) and 46-55 (76% NR) had the most negative attitude to the discussed issue. while people aged 26-35 (49.4% PR) and the oldest respondents (44.4% PR) were on the other side of the spectrum. Taking into account the employment status of the respondents, the groups working "face to face" (65.7% NR) and in the hybrid mode (61.6 % NR) during the pandemic were more negative, while the group of people working online was the most divided in their opinions (46.8% NR and 42.6% PR). Finally, as for the regions, Europeans and Asians were strongly against the statement (74.8% NR and 54.1% NR accordingly) while Americans disagreed (53.4% PR and only 33.1% NR).

3.3. The attitude towards VR

The results of the study indicate in general that the VR technology is regarded an exciting development (87.6% PR) where marital status (U=14988,00; p<0.05), level of education (H4,389=9,496; p<0.05), age (H4,390=16,771; p<0.05) and employment status (H2,348=10,671; p<0.05) are the source of differences. Singles were more positive towards the statement than married people (93.2% PR to 83.5% PR), similarly, engineers (96.7% PR) and people with primary and lower education (100% PR) in relation to people on the other levels of education. The younger the respondents, the more positive they are about VR as an exciting technology (aged 18-25 had 94.4% PR to 77.8% PR for the oldest). Moreover, the respondents working in the hybrid mode (95.6% PR to 88.6% PR F2F and 83.4% PR Online) showed a more positive response than the other groups.

A majority of the respondents agree that VR technology will have a significant impact on the way we live (78.8% PR to 8.8% NR) so as that there should be more VR solutions available for us (82.6% PR to 6.0% NR). In both of the abovementioned cases, there were no statistically significant differences in the responses.

A majority of the respondents are also up to date with developments within the VR technology (63.5% PR to 21.8% NR). Depending on the gender (U=14580,50;p<0.05), the marital status (U=13712,50;p<0.05), age ($H_{4,390}$=17,921; p<0.05) and region ($H_{2,348}$=32,520; p<0.05), differences have been noted. As expected, men were more positive (70% PR) about the statement than women (54.9% PR). Also, married respondents (69.2% PR) were more positive about the statement than singles (53.4% PR). The respondents aged 26-35 were the most positive about the statement (71.4% PR), followed by the oldest (61.1% PR) and the youngest (59.8% PR). All the regions showed a positive attitude towards the statement, with the highest percentage in the USA (75.5% PR), followed by Asia (68.9% PR) and Europe (45.9% PR).

3.4. Usage of VR tools during COVID-19 and the attitude towards VR tools in the pandemic

According to the respondents, VR tools are useful in the pandemic (81.3 % PR to 8.5% NR) where, again, women (86.6% PR to 5.5% NR) are a bit more positive than men (78.1% PR to 11.0% NR) about the subject ($U=15234{,}50$; $p<0.05$).

76% of the respondents have used VR tools in the pandemic, and the married ones (82.4% to 64.6%) used them more than singles ($U=14631{,}50$; $p<0.05$), people working online (81.1% to 69.0% to 64.7%, accordingly) more than people working in the hybrid mode or face to face ($H_{2,345}=10{,}675$; $p<0.05$) and respondents from USA (90.7% to 69.9% to 59.5%, accordingly) more than respondents from Asia and Europe ($H_{2,345}=37{,}317$; $p<0.05$).

A majority of the researched population agreed with statement that a VR tool can be more enjoyable in the pandemic (79.5% PR to 7.5% NR) and there was not statistically significant differences. On similar note, a VR tool can help the respondents with the emotional and mental pressure in the pandemic (72.2% PR) and, depending on the level of education ($H4{,}389=13{,}080$; $p<0.05$) and age ($H4{,}390=13{,}503$; $p<0.05$), the responses differed. The best educated respondents (64.6% PR) were less positive in relation to the other groups. Moreover, the younger the respondents (74.8% PR for 18-25 and 76.6% PR for 26-35 to 52% PR for 46-55 and 61.1% PR for over 55), the more they agreed with this statement.

VR can also be seen as a travel substitution tool during the pandemic according to a majority of the respondents (70% PR) with differences depending on the marital status ($U=15001{,}50$; $p<0.05$), level of education ($H4{,}389=15{,}256$; $p<0.05$) and region ($H2{,}345=6{,}203$; $p<0.05$). Married respondents were more positive than singles (74.6% PR to 63.4% PR), engineers again were the most positive about the statement (80% PR), while respondents from USA (74.8% PR) were more positive about the statement than respondents from Europe (68.5% PR) and Asia (67.6% PR).

3.5. Behavioural intentions

Most of the respondents would recommend to others the use of VR applications for tourism purposes (74.6% PR) and, depending on their age ($H_{4,390}=11{,}691$; $p<0.05$), marital status ($U=15086{,}50$; $p<0.05$) and level of education ($H_{4,389}=13{,}640$; $p<0.05$), differences have been found. The most willing to recommend VR applications for tourism were respondents aged 26-35 (81.8% PR) with all the other age groups being also mostly positive. Married respondents (77.7% PR) were more positive about the statement than singles (67.7% PR) and engineers were the most positive group about it (90% PR) when taking into account the level of education of the respondents.

The respondents were willing to pay to use VR applications in tourism (64.2% PR to 23.6% NR), differences have been found depending on age ($H_{4,390}=16{,}789$; $p<0.05$), marital status ($U=12577{,}00$; $p<0.05$), level of education ($H_{4,389}=21{,}568$; $p<0.05$) and region ($H_{2,348}=41{,}360$; $p<0.05$). The group most willing to pay were people aged 26-35 (73.4% PR to 14.94% NR), while, unsurprisingly, the youngest were the least willing (52.3% PR to 32.71% NR). Married respondents (73.2% PR to 16.1% NR) were more willing to pay than singles (49.7% PR to 35.4% NR). Taking into account the criterion of the degree of education, engineers were the group most positively oriented towards the discussed issue (69.8% PR to 16.4% NR), while this indicator was not only the lowest in the group with secondary level of education, but also the group was generally negative about the statement (37.8% PR to 44.4% NR). The level of acceptance of the statement was very interesting, taking into account the regions: clear acceptance in Asia (79.7% PR to 12.2% NR) and the USA (74.2% PR to 13.5% NR), while in Europe there was a clear division, with a majority of people opposed to this solution (41.4% PR to 42.3% NR).

Having access to VR, most of the respondents intended to use it (85.2% PR to 6.5% NR) and no statistically significant differences were found. The respondents are willing to use VR to collect information on a destination (82.9% PR to 6.5% NR) while, depending on their level of education ($H_{4,389}$=10,189; $p<0.05$) there were differences i.e. groups with relatively higher levels of education (e.g. engineers 90% PR) were more positive about the statement than those with primary and secondary level (e.g. secondary level 73.3% PR).

A majority of the respondents are also willing to use VR to experience a destination (77.2% PR to 12.4% NR) with the differences depending on the marital status (U=15852,00; $p<0.05$) and level of education ($H_{4,389}$=17,890; $p<0.05$). Married respondents (79.9% PR) were more willing to use VR to experience destination than singles (71.4% PR), while respondents with a secondary level of education were less positive about the matter (53.3% PR) than other educational level groups (e.g. master's degree and above 79.6% PR).

Discussion and recommendations

In the wake of the COVID-19 pandemic, the tourism sector is undergoing dynamic changes that require an appropriate response to the unmet tourism demand due to highly reduced mobility. Virtual reality tools are used more often, giving a new meaning to the tourism space - a geographical space of real, spiritual and virtual nature. Destinations need to be therefore aware of how the VR tools influence the attitudes of their target groups.

According to our research, the respondents know VR mainly as a gaming tool which is well in line with the industry reports (e.g. FinanceOnline, 2021; FortuneBusiness Insights, 2021), however they have already used it for tourism purposes. In general, they perceive VR as easy to use and learn to operate, and an enjoyable activity.

Notably, younger people usually assessed these issues higher than older ones and people with the highest education usually assessed them below the average. Moreover, in general, people working online found less fun and enjoyment in VR solutions, as they were/are probably tired with the on-line environment. Finally, women found it a bit harder to learn to operate and use the VR solutions than men.

Although the respondents see benefits of VR in tourism such as helping in planning tasks and access to information, they are divided in the opinion if VR in tourism is a good idea.

According to the respondents, VR tools are useful in the pandemic and most have used them. A majority of the researched population agree with the statement that a VR tool can be more enjoyable in the pandemic and can help to cope with the psychological and mental pressure caused by isolation. The results show that young people have had the biggest psychological problems in the pandemic and see VR as a tool that can help them to overcome this difficult situation.

Interestingly, according to a majority of respondents, VR can also be seen as a substitute of travelling during the pandemic. On the one hand, there were opinions that the lack of spontaneity, the inability to purchase things as well as the lack of relaxation were are all the reasons why the prospect of using VR as a substitute for actual travel is limited (Guttentag, 2010). On the other hand, by looking at the relationship between the perceived risk of travelling and the technological acceptance of VR specifically in the COVID-19 context, Sarkady et al. (2021) found that tourists use VR as a substitute of travelling during and even after the pandemic. Our research seems to support this view. This result means that destinations should use COVID-19 as an advantage for wider implementation of VR solution to use it more effectively in the future as people will get more familiar with what VR has to offer.

However, for the group of young people who (according to the research results) are the most interested in VR and enjoy it the most, the potential fees for using VR will create a

significant obstacle. Similarly, the requirement to pay for access to VR solutions might not be accepted in Europe, according to the survey's results.

Also, it seems like men need additional motivations to use VR, especially for tourism purposes. Women are a group that appreciates VR more in the pandemic therefore it is important to adjust the content and style of communication via VR to them.

Another implication of the research is that in the specific crisis situation, VR technologies can be seen not only as a way of enabling tourists to gain information about a destination without crossing the borders. There is also a growing interest and an opportunity for cutting-edge technologies contributing to destination recovery by boosting interest and providing an environment for experiences, as noticed also by Huang et al. (2016).

The research has some natural limitations because, as in any survey based on online questionnaires, the respondents had their own understanding of VR, even though a short explanation was provided at the beginning of the survey. Therefore, the aim of the study was to look at a general perception based on the respondents' experience and knowledge.

To a large extent, the research results are consistent with how people perceive technological solutions in general (Digital 2021) (as TAM items measure the technology acceptance). The isolation has not changed the general preferences, however the results show that VR has the potential to extend the boundaries of tourism and destinations' activities, and COVID-19 has a role to play in shaping people's attitudes and behaviours towards VR in the context of tourism. The positive opinions about VR solutions in tourism (which is also in line with some of the conclusions from the Ericsson ConsumerLab Merged reality report, 2017) and its pandemic context show that isolation can be perceived as an opportunity in this case, especially when taking into account the predictions about consumer tech spending spiking to $461B in 2021 (spglobal.com).

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