

NON-IMMERSIVE FORMS OF VIRTUAL REALITY (NIVR) AND ATTITUDES TOWARDS TRAVEL DESTINATIONS IN THE ERA OF COVID-19 SELF-ISOLATION

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Abstract: *The main aim of this paper is to investigate the relationship between the attitudes towards virtual reality tools and the expected attitudes towards destinations selected during the self-isolation period resulting from the global pandemic caused by COVID-19. The study employs a research model based on the modified and extended Technology Acceptance Model, with structural modelling applied for verification purposes. The measurement criteria are mostly adopted from previous research or developed by the authors. Findings indicate that VR tools are perceived as easy to use, which directly affects the perceived enjoyment and usefulness of the VR. Furthermore, virtual reality tools are perceived as more useful when there is no alternative means of experiencing the external (real) world. The research model also confirms that the cognitive component of the users' attitude directly influences their behaviour, whereas the affective dimension is not significant. This indicates that non-immersive VR tools and materials are perceived primarily as a conduit for disseminating pertinent information and providing the opportunity to compare destinations and make more informed decisions. In addition to these practical findings, this paper also contributes to this research strand by considering the influence of the COVID-19 pandemic on the acceptance of virtual reality (VR). Finally, the proposed model further extends the TAM to different attitude aspects, such as behavioural, cognitive and affective components.*

Keywords: *Virtual Reality, non-immersive VR, destination, COVID-19, tourism, consumer behaviour.*



INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), known as COVID-19, discovered in December 2019 in Wuhan, China, was declared a pandemic by WHO on March 11, 2020. By April 2022, the number of cases worldwide reached 289,471,418, with 6,179,531 confirmed deaths (John Hopkins COVID-19 Resource Center, 2022).

In the event of an epidemic, the most effective means of preventing the transmission of the disease include self-isolation and lockdowns, quarantine, and social distancing (Florek & Lewicki, 2022). The consequences of the Coronavirus Disease 2019 (COVID-19) pandemic have been far-reaching, affecting nearly every aspect of life and business (Fernandes, 2020; McKibbin and Fernando, 2020; Tovmasyan, 2023). The Travel and Tourism (T&T) industry has been particularly hard-hit (UNWTO, 2020a).

A notable consequence of the SARS-CoV-2 pandemic is a transformation in human behaviour and consumption patterns, including alterations in mobility preferences due to the associated risks of travel. The latter are among the most significant factors influencing the decision to travel in general, as well as the selection of specific destinations (Rittichainuwat and Chakraborty, 2009; Garg, 2015; Sarkady et al., 2021). In response to the growing consumer anxiety and uncertainty, there has been a significant increase in the utilisation of alternative forms of access to destinations. VR is gaining momentum in this context, as it enables users to explore virtually by manipulating computer-generated images or videos, thereby simulating real-life experiences and even offering an alternative to travel (Guttentag, 2010; Loureiro et al. 2020). Furthermore, it enables users to virtually "visit" the most remote locations on Earth (Sarkady et al. 2021). Both industry statistics and researchers suggest that VR has great potential in situations where a real-life experience is challenging to attain (Lee and Kim, 2021).

According to World Tourism Organization (2020), SARS-CoV-2 pandemic has in fact created opportunities for destinations to prioritize innovation, particularly in the digital domain. In the context of the global pandemic, there has been a growing necessity to engage with visitors virtually, given the unavailability of other options, with the aim of providing information, delivering experiences, and eliciting positive sentiments towards destinations and specific tourist attractions (Yung et al. 2021). Consequently, the UNWTO Secretary-General, Zurab Pololikashvili, stated: "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, 2020b).

It is important to note that virtual reality (VR) can be categorised into different forms. Non-immersive VR (niVR) systems represent the simplest and most readily available options, and therefore the most common (Carrozzino and Bergamasco, 2010; Dörner et al., 2013). A conventional computer screen is sufficient to simulate a three-dimensional space, allowing the participant to observe and interact with it (Dörner et al., 2013; Liu et al., 2016). In literature gaps can be found which relate to the dimensions of consumer behaviour and their experience with VR (more in Yung et al. 2020). COVID-19 appears as a subject of the latest research but primarily as the background for ongoing discussions. Concurrently, these novel circumstances may exert a considerable influence on the manner in which individuals assess VR technologies and the potential impact of VR on their attitudes towards destinations.

The goal of this paper is therefore to investigate the relations between the attitudes towards virtual reality tools and the expected attitudes towards the destinations which apply them, in

self-isolation caused by COVID-19. The research model is based on the Technology Acceptance Model (TAM), as proposed by Davis (1989), which has been modified and extended in order to achieve the objectives of the study.

The premise of the present study is that, in the new pandemic context, people might want to use VR forms more often and, preferably, it might influence their attitudes (cognitive, affective and behavioural) towards destinations. In instances where individuals are unable or unwilling to travel to crowded locations and seek experiences with minimal human interaction, virtual reality (VR) technology provides an avenue for engaging in such experiences without the necessity of physical presence (Buhalis and Motloka, 2013; Zakrzewski et al., 2022). This potential persists even after the completion of self-isolation (Mohanty et al., 2020). In light of the significant shift in consumer behaviour and activity from traditional, face-to-face settings to digital, online environments, it is imperative to conduct a comprehensive examination to gain a deeper understanding of tourist behaviour (Lee et al., 2021) and its implications for destinations.

Specifically, the study aims to:

- determine the influence of the COVID-19 pandemic on the acceptance of virtual reality (perceived usefulness, perceived ease of use, perceived use enjoyment),
- determine the impact of niVR usage on the cognitive component of destination attitude in the era of COVID-19
- determine the impact of niVR usage on the affective component of destination attitude in the era of COVID-19
- determine the effect of niVR usage on the behavioral component of destination attitude in the era of COVID-19.

LITERATURE REVIEW

Virtual Reality

Virtual reality (VR) can be defined as a set of images and sounds produced by a computer that simulate the experience of a real place or situation (dictionary.cambridge.org). The conceptual manifestations of virtual reality have a history that can be traced back to the late 1920s, as evidenced by The Link "Blue Box" Trainer Flight Simulator (McFadden, 2018). Thompson (2017), on the other hand, posits that the birth of virtual reality can be traced back to the mid-19th century with the invention of stereoscopes.

The thematic scope of publications about VR is extensive, encompassing a multitude of disciplines, including military applications (Lele, 2013), medical applications (Goo et al., 2020), gaming (Viitanen et al., 2018) and tourism (Schiopu et al., 2021; Flavián et al., 2021). The tourism sector has recently attracted the greatest interest, largely due to the global restrictions imposed by the Coronavirus Disease 2019 (Covid-19) pandemic (Florek & Lewicki, 2022). Conversely, the term is also the subject of criticism, with calls for a unified definition (Kardong-Edgren et al., 2019) and concerns that it is being stretched too far (Laurel, 2016). For the purpose of this study, the term 'VR' is defined as follows: "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, p. 25).

In his 2013 study, Mandal posited that virtual reality (VR) systems can be classified into three categories based on the level of immersion they offer:

- Non-Immersive (Desktop VR) systems – in spite of the name suggesting fully non-immersive option, they do represent a low level of immersion and as such do not require employment of any special or complicated devices in application.
- Semi-Immersive (Fish Tank VR) systems – are an improved version of Non-Immersive systems, supporting head tracking; these systems improve the feeling of presence.
- Immersive systems – can be seen as the ultimate version of VR systems, allowing total immersion in the virtual world with the help of dedicated devices including dedicated audio, haptic and sensory interfaces.

Non-immersive virtual reality (VR) systems represent the most prevalent, straightforward, and accessible means of accessing VR applications (Gutiérrez et al., 2008; Carrozzino and Bergamasco, 2010; Dörner et al., 2013). In addition to computer games, non-immersive virtual reality is exemplified by 360° environments, wherein users can view 360° content (e.g., city panorama) by moving or rotating the device (e.g., PC, tablet, or smartphone) on which the content is played. (Repetto et al., 2018). This solution is now widely employed, for instance in the field of tourism, where it takes the form of so-called "virtual tours" (El-Said and Aziz, 2021; Bilan et al., 2024).

Measurement of attitudes towards technology

The use of information and communication technology (ICT) expands constantly to new sectors of the economy since the late 1980s and is naturally accompanied by numerous studies on the acceptance of the technology by users (Swanson, 1988; Davis, 1989; Thompson, Higgins, Howell, 1991). One of the oldest and most frequently used models of technology acceptance is the TAM (Technology Acceptance Model) introduced by Davis (1989) in 1989.

The origin of the TAM are the principles adopted from Fishbein and Ajzen's (1975) attitude paradigm. Since its introduction, countless variants have emerged across a variety of scientific disciplines. The TAM was criticized by the scientific community (e.g. Chuttur, 2009; Bagozzi, 2007) for its triviality and flexibility which, in a sense, led to theoretical chaos. Nevertheless, it is owing to the aforementioned features that a lot of interesting research into this topic has been possible and conducted (Wang et al., 2003). There is no perfect model to measure the users' attitudes towards technology and each of technology acceptance theories has some weaknesses (Riffai et al. 2012). Yet, a review of literature clearly shows that the TAM continues to be the starting point for many contemporary studies (e.g. Vahdat et al., 2021; Yuen et al., 2021). The tourism industry is no exception. The latest research in this industry, based on the extension of the TAM, covers a very wide spectrum of issues related to the ICT, e.g.: the attitude and behaviour toward using the DCM (Digital Content Marketing) for tourism purposes (Mathew, Soliman, 2021); the attitude and behaviour toward using the Internet to search for information related to eco-tourism (Sadiq and Adil, 2021) etc.

Despite the fact that the TAM has been commonly modified and extended over the years, most of these changes focused on the left side of the model, often leaving its right side completely unchanged (Figure 1).

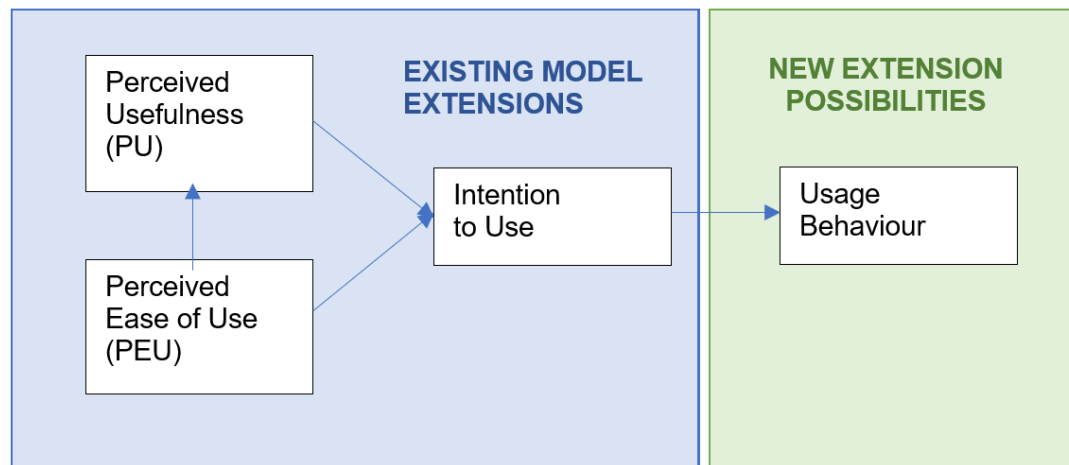


Figure 1. The focal point for changes to the Technology Acceptance Model.

Source: Own work based on Davis, 1989.

Starting with the updated version of TAM (i.e. TAM2 that extended the model with external variables affecting PU and PEU (Venkatesh and Davis, 2000)) and the Unified Theory of Acceptance and Use of Technology (i.e. UTAUT which introduced four key constructs determining usage intention and usage behaviour (Venkatesh et al., 2003)), most of the later extensions (including all of the aforementioned TAM modifications in tourism) followed the pattern by incorporating more and more external variables to serve a purpose of a given study. This creates a clear cognitive gap for any future iterations of the model. For the purpose of the current research, the original TAM was used as a source of inspiration and a starting point for further modifications.

Measurement of attitudes towards destinations

According to the most applied definitions, attitudes are personal evaluative reactions to socially relevant issues concerning specific objects, events, people, contexts and/or behaviours (Passafaro, 2020). Fishbein and Ajzen (1975) understand attitudes as learned predisposition to responding in a consistently favourable or unfavourable manner with respect to a given object. Eagly and Chaiken (1993, p.1) define attitude as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour”. The evaluation statements can be therefore either favourable or unfavourable, as they reflect how one feels about something (Robbins, 2010). In tourism, attitude is commonly understood as the tourists’ predisposition or feelings toward a destination and related services, which is based on perception of tourism products and attributes of the destination (Pereira et al. 2019).

The Theory of Planned Behaviour deals with the nature of behavior-specific factors that are designed to predict and explain human behaviour in specific contexts (Ajzen, 1991). In the destination context, the Theory proposes that a tourist’s behavioural intentions are formed based on their attitude, social norms and perceived behaviour controls towards visiting a destination (Fishbein and Ajzen, 1975). Tourism scholars have applied the Theory to study attitude as a determinant of behavioural intentions of choosing a destination. Based on the

literature review, Hadinejad et al. (2021) conclude that previous research confirmed the significant impact of attitude towards a destination on intention to visit. It is important to note, however, that although the Theory is the most commonly applied theoretical framework to explore visitors' attitudes towards tourist destinations, it has been criticized regarding their inability to address the affective aspect of attitude formation. As such, the Cognitive Response Theory considers the role of the valence of thoughts (favourable or unfavourable) in influencing attitude. The elaboration likelihood model and heuristic systematic model discuss the amount and valence of thinking as determinants of attitude, and highlight the cognitive and affective aspects of attitude formation (see Hadinejad et al. 2021).

Attitude should be therefore analysed according to the three components (Eagly and Chaiken, 1993): cognitive, affective, and behavioural. The cognitive response is the evaluation made on the basis of information and knowledge about a destination; it is comprised of thoughts (often conceptualized as beliefs) about the attitude object. The affective response is the evaluation of the destination made on the basis of feelings, moods and, emotions of the tourists. The behavioural (conative) component is a tendency or disposition to act in certain ways toward a destination.

As Pearce and Packer (2013) suggest "the attitudes tourists hold towards the people and places visited are not fixed and standard entities but shifting, socially negotiated communications" (p. 391). In the COVID-19 situation, it is an important consideration as attitudes might be context dependent (Pearce and Packer, 2013).

RESEARCH METHODOLOGY

Based on the literature review on VR and its use in tourism to date, the following research model has been proposed (Figure 2). It should be noted that in the past two years, there has been a big upsurge of publications on both VR and the COVID-19 pandemic, especially in relation to tourism. While there is a stream of research signaling the importance of VR use in tourism during the pandemic, it focused primarily on the acceptance of the VR itself. The model presented in Figure 2 is a step forward and is meant to measure the influence of VR use in tourism (in its most accessible non-immersive form) on the attitudes of the system's users towards destinations. It should be noted that this impact will be examined in relation to three elements of attitudes, which fills the existing research gap.

Although extending the TAM model with external factors is not a novel concept, extending it towards its consequences, such as attitudes, can be considered a significant contribution to the field. The fundamental structure and the relationships between its components have remained consistent in relation to its prototype since 1993. Regarding the external factors, the influence of the COVID-19 pandemic perspective (COV) on technology (VR in general) acceptance is taken into consideration. Moreover, we have decided to add an element of intrinsic motivation - Perceived Use Enjoyment (PUE) included in previous studies by Teo et al. (1999) as a potential significant factor during the pandemic. The proposed model further extends directly to the attitude aspect, consequently including: the Behavioural Component (BC), the Cognitive Component (CC) and the Affective Component (AC).

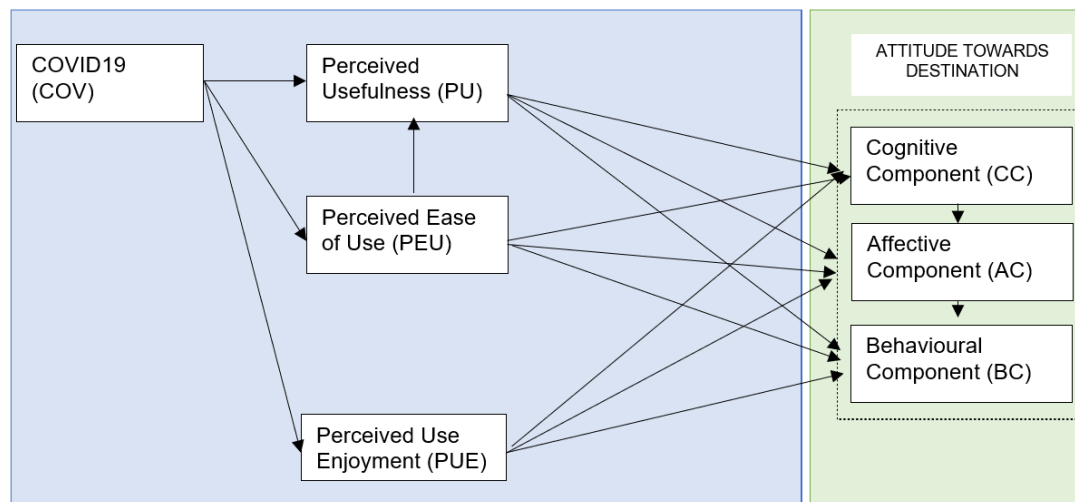


Figure 2. The research model.

Source: Own research.

The method applied to verify the research model was structural modelling. The items used to measure the relevant constructs were mostly adopted from literature on the subject and several developed by the authors (Table 1). In the research process, the respondents were asked to refer to a number of statements on a 7-point Likert scale.

Table 1. Items measuring model constructs.

CONSTRUCT	ITEM	SOURCE
PERCEIVED USEFULNESS	Using VR applications in tourism is a good idea.	Schiopu et al., 2021
	I think VR is useful for travel planning.	Disztinger, Schlögl and Groth, 2017
	I think VR offers access to accurate and reliable information about destinations at a fraction of the cost, time and effort compared to traditional promotional material.	Buhalis, 1998
PERCEIVED EASE OF USE	Learning to operate VR was easy for me.	Disztinger, Schlögl Groth, 2017
	I find VR easy to use.	Hong, Thong, Tam, 2006
PERCEIVED USE ENJOYMENT	I find using VR enjoyable.	Disztinger, Schlögl Groth, 2017
	I have fun using VR.	Disztinger, Schlögl Groth, 2017
	Using VR is pleasant.	Disztinger, Schlögl Groth, 2017
COGNITIVE COMPONENT	The (niVR) material provided me with reliable information in a fast and convenient way about a destination.	Rainoldi et al., 2018
	After seeing (niVR) material I feel I know more about a destination.	Own work
	The (niVR) material provided me with a richer visual and auditory experience about a destination.	Durlach, Mavor, 1995
EMOTIONAL COMPONENT	The (niVR) material and presented within it destination touched on and induced emotions.	Rainoldi et al., 2018
	I found watching the (niVR) material presenting the destination pleasant.	Carù, Cova, 2006; Riva et al., 2007; Jennet et al., 2008; Hansen, Mosberg, 2017; Lee, Kim, 2021

BEHAVIOURAL COMPONENT	I found watching the (niVR) material presenting the destination relaxing.	(Carù, Cova, 2006; Riva et al., 2007; Jennet et al., 2008; Hansen, Mosberg, 2017; Lee, Kim, 2021
	After experiencing the (niVR) material, my desire to visit the destination is stronger.	Lee, Kim, 2021; Rainoldi et al., 2018
	After experiencing the (niVR) material, I am willing to recommend visiting the destination.	Rainoldi et al., 2018
	After experiencing the (niVR) material I'm willing to recommend the material to my friends.	Own work
COVID-19 PERSPECTIVE	I think VR tools are useful in the pandemic.	Own work
	VR tools can be more enjoyable in the pandemic.	Own work
	VR tools can help me with psychological and mental pressure in the pandemic.	Yang et al. 2021

Source: Own research.

During the survey, after responding to the questions on the COVID-19 situation and opinions on VR technology, the respondents were asked to use niVR material - a virtual tour of Dubai (reflecting at the same time the very actual use of VR which is included in the original TAM). After using the tool, they could answer the next part of the survey which related to attitudes towards a destination.

Data have been collected between 4 and 21 October 2021 via an online questionnaire completed by individuals with any type of experience with the VR technology (e.g. gaming) via tourism-related Facebook groups and forums (74 global and regional groups and 7 forums were selected). During the data collection, in most cases FB banned the invitation to participate in the survey (with 8 groups and 2 forums left) therefore the Amazon Mechanical Turk platform was used to complete the research sample (among individuals who met the same requirements). This resulted in the sample size of 386 (391 questionnaires were collected, but 5 were eliminated as incomplete) with respondents from 40 countries.

The respondents were asked to specify their gender, age, nationality (categorised later according to the world region), the education level, marital status, the mode of working during the pandemic (online, face to face, hybrid) and travel experience during COVID-19 (see Table 2 for sample characteristics). These characteristics have been used for detailed analyses that are beyond the scope of this paper and the main focus of the discussion (they have been presented in Florek, Lewicki, 2022).

Table 2. Sample characteristics, N=386.

Characteristic	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 above	10.1
TRAVEL BEHAVIOR IN PANDEMIC	
I have travelled during the pandemic	69.2
I have not travelled during the pandemic	30.6
I plan to travel during the pandemic	72.0
I don't plan to travel during the pandemic	27.2

Source: own research.

As presented in Table 2, the majority of respondents were male (54.4% of men compared to 42.5% of women). The vast majority (42.2%) are residents of the United States, followed by representatives of European and Asian countries. The largest cohort of respondents was comprised of individuals aged 26-35, representing nearly 40% of the total sample. The proportion of respondents in the 46-55 and over 55 age groups combined constitutes only slightly over 11% of the total surveyed population. Almost 90% of respondents had obtained a higher education qualification. During the period of the pandemic, over 60% of respondents indicated that they were employed exclusively in an online capacity, while less than 10% reported that they were engaged in face-to-face work. It is also noteworthy that nearly 70% of respondents engaged in travel activities during the pandemic, either as actual travelers or as individuals with planned travel.

RESEARCH RESULTS

Construction of the structural equation model started with building a measurement model (Figure 3). To this end, Confirmatory Factor Analysis (CFA) was used that makes it possible to check the relations between observable indices and latent factors. The model's parameters have been calculated by means of Maximum Likelihood (ML); AMOS software has been used to model the structural equations. In the ultimate version, the variables with the smallest factor loads were excluded from the measurement model. When removing the data, modification indices were also taken into account together with the requirement of describing each hidden variable by at least three observable indicators for the structural model to be identifiable.

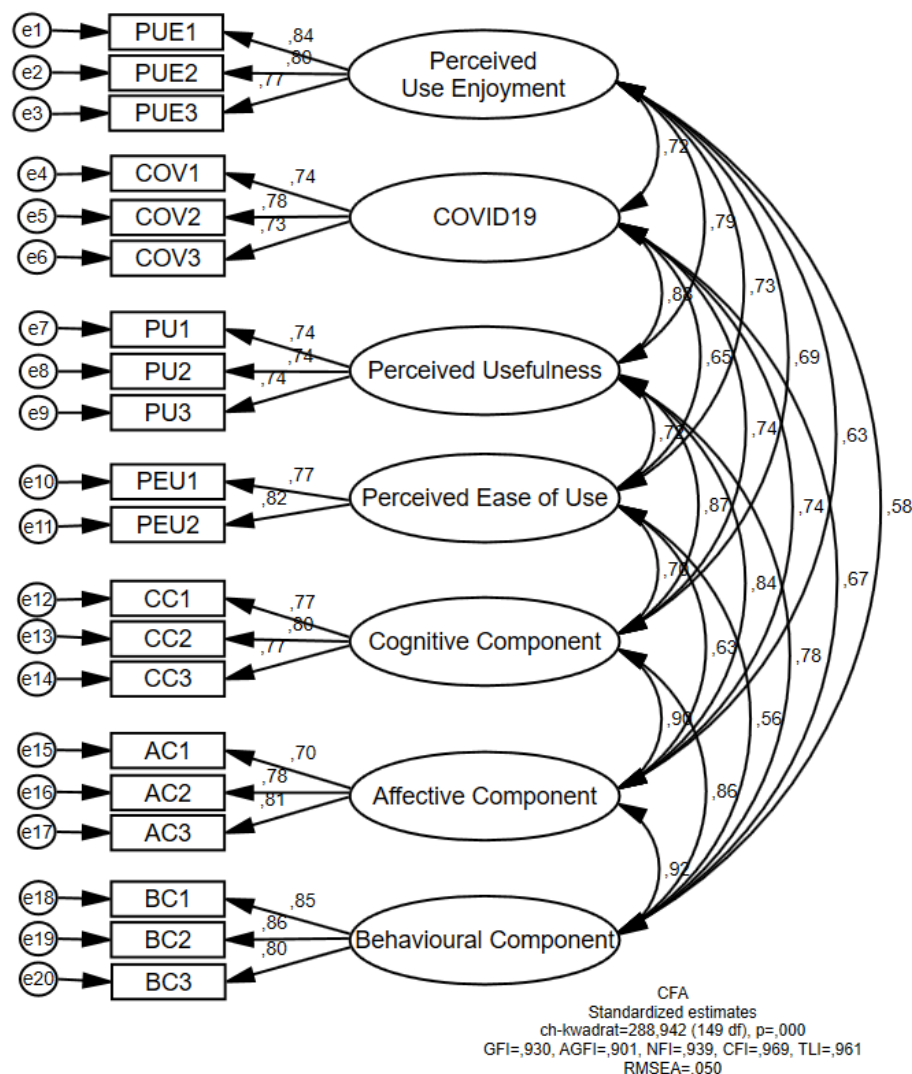


Figure 3. The measurement model.
Source: Own research.

All the factor loads are statistically relevant and exceeding 0.7. The evaluation of the quality of the measurement model of the seven hidden variables and twenty observable indicators has been done by means of a number of measures of the goodness of fit model i.e. CMIN/DF = 1.939; RMSEA = 0.05; GFI = 0.93; NFI=0.939; the IFI= 0.97 CFI=0.969 AGFI=0.901 and the PGFI=0.66, which indicates a model's acceptable fit.

Finally, the convergent validity was evaluated of the measurement of the theoretical constructs. On the basis of the AVE and CR indices, high homogeneity of elements of the measuring scales can be acknowledged (PUE, COV etc.) (Table 3).

Table 3. Evaluation of the reliability of measurement of hidden variables.

Hidden (latent) variable	Questionnaire statement (observable index)	Standardised loading (λ)*	α	AVE	CR
PUE	F19_I_have_fun_using_VR	0.798			
PUE	F18_I_find_using_VR_enjoyable	0.840	0.84	0.65	0.85
PUE	F20_Using_VR_is_pleasant	0.774			
COV	B4_VR_tools_can_be_more_enjoyable	0.775			
COV	B2_I_think_VR_tools_are_useful_in	0.735	0.79	0.56	0.79
COV	B5_VR_tools_can_help_with_psychol	0.726			
PU	D13_I_think_VR_is_useful_for_trave	0.740			
PU	D12_Using_VR_applications_in_touri	0.737	0.77	0.55	0.78
PU	D14_I_think_VR_offers_access_to_ac	0.738			
PEU	E16_Learning_to_operate_VR_was_eas	0.767	0.78	0.63	0.77
PEU	E17_I_find_VR_easy_to_use	0.819			
CC	H32_After_seeing_VR_material_I_fee	0.798			
CC	H31_The_VR_material_provided_me_wi	0.770	0.82	0.61	0.82
CC	H33_VR_material_provided_me_richer_visual	0.769			
AC	I37_I_found_watching_the_VR_materi_pleasant	0.785			
AC	I36_The_VR_material_touched_on_and	0.703	0.73	0.59	0.81
AC	I38_I_found_watching_the_VR_materi_relaxing	0.813			
BC	J43_After_experiencing_the_VR_mate_recommend	0.855			
BC	J42_After_experiencing_the_VR_mate_visit	0.849	0.87	0.70	0.87
BC	J45_After_experiencing_the_VR_mate_material	0.801			

*p< 0.001

Source: Own research.

On the basis of the research model and the results, the structural model has been specified as presented in Figure 4.

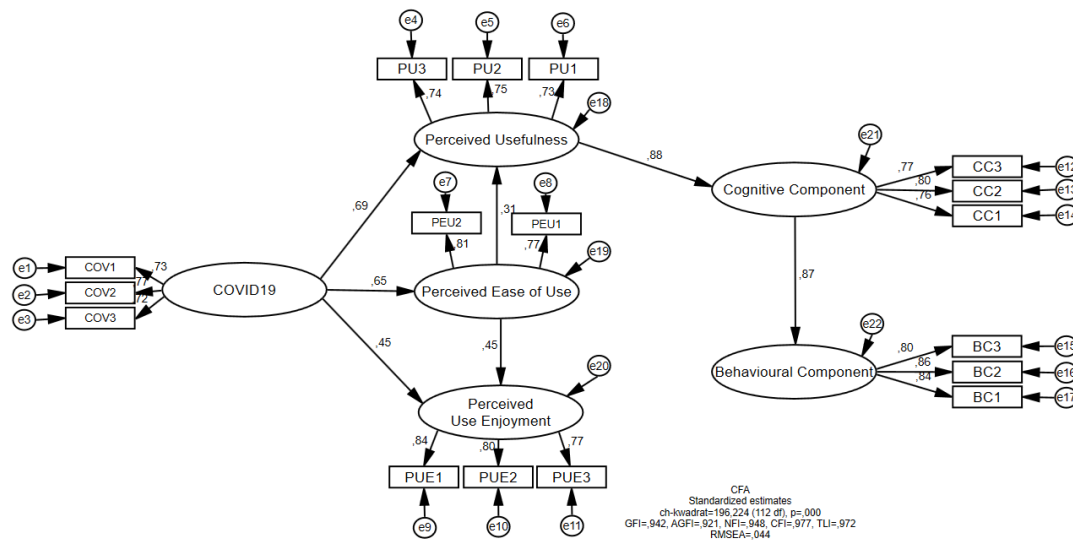


Figure 4. The structural model.

Source: Own research.

The model presents good fit with the data i.e.: CMIN/DF 1,752; GFI 0,942; AGFI 0,921; NFI 0,948; RFI 0,937; IFI 0,977; TLI 0,972; CFI 0,977.

As a result of the work, the following statistically significant relationships are extracted from the model:

1. the COVID-19 pandemic affects: a. perceived usefulness of VR; b. perceived ease of use of VR; c. perceived enjoyment of VR
2. perceived ease of use of VR affects: a. perceived usefulness of VR; b. perceived enjoyment of VR
3. perceived usefulness of niVR affects the cognitive component of attitudes toward the destination
4. the cognitive element of attitudes influences the behavioral element of attitudes toward a destination.

No statistically significant relationships were found for the other elements. Thus, the perceived ease of use of non-immersive forms of VR and enjoyment of niVR do not directly influence attitudes toward destinations in the pandemic. Simplifying the findings, it can be concluded that niVR is primarily evaluated as a useful tool (during pandemic-induced isolation) that influences cognitive (rather than emotional) processes, which in turn influence behaviours toward destinations (such as intention to visit or recommendations).

DISCUSSION

Based on the presented research, we can conclude that an external factor i.e. COVID-19 perspective (COV) and an intrinsic motivator i.e. Perceived Use Enjoyment (PUE), are both significant TAM extensions. There is a positive and relatively strong correlation between the external condition which is the pandemic (COV) and both original TAM elements such as Perceived Usefulness (PU) and Perceived Ease of Use (PEU) of VR (in general). Therefore, it can be concluded that the pandemic indeed has a positive effect on people's perception of VR within both elements. Similarly, COV influenced Perceived Use Enjoyment (PUE), however, the intensity of this influence was lower. In the case of PUE, no direct or statistically significant correlation was found between PUE and the components of attitude towards destination (i.e. the assumption of the conceptual model has not been confirmed). Nevertheless, it should be emphasized that this factor is related to the aforementioned COV and PEU, where it is positively influenced by both factors. In the case of PEU's influence on PUE, it should be noted that it confirms previous studies carried out by Teo et al. (1999) as well as van der Heijden (2004). Notably, while in some of the previous studies on the TAM there was a positive correlation between PUE which influenced PU and PEU (e.g. Mun, Hwang, 2003; Mujiyati and Achyari, 2009; Ha and Stoel, 2009), no such correlation was found in our research. The correlation between the PEU and PU variables from the original TAM was confirmed, where PEU positively influenced PU (Davis, 1993). In relation to the research model, no direct relationship was found between PUE and the components of attitude towards a destination, while in the case of PU, a direct influence of this factor was found only for the cognitive component of attitude (CC). It should be noted, however, that in relation to PU, there is an indirect relationship also with the behavioral component of the attitude (BC), since a direct influence of CC on BC was found.

The findings of the research indicate that the majority of users perceive virtual reality (VR) tools to be straightforward to use, which subsequently impacts their overall enjoyment and perceived usefulness of the VR technology. The limited possibilities available during periods of self-isolation have a positive influence on each of the three constructs (namely PUE, PU and PEU), with the strongest correlation observed between the perceived usefulness (PU) of VR. It can be reasonably assumed that the utility of VR tools is perceived to be greater when there is no alternative means of experiencing the external (real) world.

Proceeding with the other side of the model, the attitudes towards destinations influenced by specifically niVR were investigated to analyse the potential effect of actual use of the tool. While the cognition-affect-behaviour structure of attitude has been accepted as a useful framework, there is a strong line of research that regards attitudes as having cognitive and affective dimensions that affect one's behaviour (Kim and Stepchenkova, 2015). In the aforementioned study, which investigated non-immersive forms, it was found that the cognitive component (CC) directly influences the behavioural component (BC) of users. The content had a positive effect on the respondents, who were more willing to recommend the destination, visit it again, and recommend the niVR material itself. The affective dimension (AC) was found to be of lesser importance, potentially due to the fact that it is immersive forms that facilitate users having a more realistic tourism experience in their desired location, thereby eliciting a stronger emotional response (Brooks, 1999; Parés and Parés, 2006). The significance of the cognitive dimension indicates that non-immersive VR tools and materials are primarily regarded as a

means of imparting pertinent information. Furthermore, the capacity to evaluate various destinations facilitates more judicious decision-making, a notion previously postulated by Cheong (1995). In particular, during the pandemic, niVR has the potential to serve as an accessible and attractive source of knowledge about destinations. This view is supported by Chiou et al. (2008) and Borawska et al. (2023) who consider virtual experiences as advertisement more efficacious than conventional marketing tools increasing the effectiveness of persuading to visit (Huang et al., 2016). And as our research confirms, niVR tools do affect the willingness to visit. It is, however, important to note that we consider the special conditions caused by COVID-19, as in general, VR is perceived as a useful tool in self-isolation, influencing CC of attitudes, and then BC.

CONCLUSIONS

It is predicted that virtual travels might increase in the post-COVID-19 era. Destinations will promote their places and travel companies will offer their services via virtual tools before the real experience (Atsız, 2021, Florek, Lewicki, 2022). As VR technology can reduce the physical distance between potential tourists and a destination (Leung et al., 2020), the emotional one is also minimized.

With the research results, it might be expected that after the pandemic, the familiarity and experience with VR gained during the COVID-19 years, will result in a tool used as a significant source of destination knowledge (in the case of non-immersive forms), influencing people's behaviours toward destinations. Even if this was only the first step – behavioural declaration to actual behaviour - the tool is worth applying on a continuous basis.

The presented research has some limitation. First, it focuses only on non-immersive forms of virtual reality. On the one hand, we consider niVR the easiest for destinations to implement and for users to handle, they do pose some limitations when it comes to creating more emotional-based environments. Immersive VR forms as a subject of research would probably highlight a more affective attitude towards destination and therefore need separate investigation. Secondly, there is always a risk in interpretation of what VR stands for to the respondents. This weakness has been addressed in our study by real usage of niVR, however the general opinions on VR among the respondents might present some bias. In addition, different niVR material or a different destination as a survey case could result in different attitudes. It is important to acknowledge that the composition of the studied population represents a potential limitation to the generalizability of the findings. The study population was predominantly male, comprised of US residents, and was relatively young (i.e., under 35 years of age). Additionally, the population included individuals who were traveling and planning a trip despite the pandemic-related restrictions. It can be posited that an alternative population structure, for instance one comprising a greater proportion of women or older individuals (i.e. aged 55 and above), would yield novel insights from the study.

IMPLICATIONS FOR RESEARCH, APPLICATION AND POLICY

In light of the aforementioned research's conclusions and limitations, it is evident that there are avenues for further investigation on this topic. For instance, valuable data could be obtained by conducting a survey of two groups and observing different niVR material to facilitate a comparison of the results. Further studies should also examine the real impact of self-isolation and niVR on attitudes toward a destination after freedom of travel was restored.

Furthermore, it can be concluded that VR represents an intriguing potential for destination managers and entrepreneurs seeking to enhance and enrich consumer experiences. Consequently, it can be considered a reliable investment for the future by organizations and companies within the tourism industry.

Finally, it can be expected that familiarity and experience with VR gained during COVID-19 will make VR (and similar virtual tools) a regular source of destination knowledge influencing people's behaviour toward destinations. Destinations should therefore take these considerations into account when designing their strategies and selecting appropriate communication tools.

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