European Online Journal of Natural and Social Sciences 2022;
Vol.11, No 4 (s) Special Issue on Hybridity in the New Reality
ISSN 1805-3602

Factors Affecting the Viability of Virtual Tourism in the Philippines

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Abstract

This study was conducted to assess the factors affecting the viability of virtual tourism in the Philippines. This employed a quantitative research design, in particular the causal research approach. Data were then analyzed using frequency distribution or percentage and the partial least squares–structural equation modeling (PLS-SEM) method. To test the hypotheses of the study, partial least squares – structural equation modeling (PLS-SEM) was utilized using WarpPLS 7.0. The findings revealed that the perceived benefit factors such as perceived usefulness, perceived ease of use, and sustainability positively affect the viability of virtual tourism in the Philippines, while in terms of perceived challenges security and navigation showed a significant positive effect on the viability of virtual tourism in the Philippines. Therefore, for future research studies, exploring other beneficial factors such as tourist behavioral factors, and other challenge factors such as financial capability and cultural factors that might help assess virtual tourism's viability in the Philippines is recommended.

Keywords: Viability, Virtual Tourism, Perceived Benefits, Perceived Challenges

Introduction

The world entered the information era due to the rise of digitalization, and tourism has become at the forefront of these developments. Virtual tourism is one of the most significant developments brought forward by the growth of digital technologies. Virtual tourism utilizes constantly emerging technology to artificially enhance and create a virtual immersive tourism experience. (Shih 1998) expanded on defining and highlighting virtual experience as the illusion of being in a mediated environment. Virtual tourism plays a crucial role in underpinning tourism, providing multiple opportunities for different professionals in the tourist industry and generating business models (UNESCO, 2020). It removes a barrier of distance to potential tourists. However, not all countries can adapt to tourism's digitalization since it demands a large scale of resources. Several countries that rank first in internet speed, such as the United Kingdom, the United States, and the Netherlands, have formed partnerships with Google and are already giving virtual tours globally (Google Arts and Culture, n.d.-b). In order to cultivate virtual tourism innovation, a country's resources and adaptability rate must be assessed to ensure its effectiveness.

Over the years, tourists immersing themselves in virtual tourism were not just a trend in particular countries but has become a global trend (Joe, 2020). According to an international study (Barnes, 2016), virtual tourism will most certainly become an indispensable tool in the coming years, forcing marketers to adapt. Tourist attractions throughout the world, such as the Vatican Museums (Vatican News, 2020), the New York Botanical Garden (NYBG, n.d.), and the Eiffel Tower (Sociéte d'Exploitation de la Tour Eiffel, 2020), began to conduct virtual tours (VTs). In addition, technologically advanced countries, such as Singapore, have launched a tourism campaign called "Experience Singapore now. Visit later." intending to invite tourists from all over the world to virtually see prominent Singapore landmarks (Singapore Tourism Board, 2020). However, the viability of virtual tourism in developing countries has not yet been proven.

As part of a developing country, the Philippines faces multiple global and local challenges requiring technology, science, and innovation (National Academy of Science and Technology, n.d.). For example, the Philippines ranked 83rd among 140 countries for mobile internet, with an average speed of 26.24 Mbps (Department of Information and Communications Technology, 2021). The Department of Science and Technology (DOST, 2016) supports this claim, stating that the Philippines are far behind in technological readiness.

The abovementioned dilemma can be seen and observed in an actual tourism situation. Many countries adapt to the booming trend of virtual tourism, yet the insufficiency of resources results in difficulty in coping with competition worldwide. Through modernization Philippines continuously tries to become accustomed to innovations and gradually upscale its service to tourists. However, if a country pushes through innovation and is not equipped with primary resources, it will create a domino effect in the latter years. Because of the continuous evolution of technology, the researchers conducted a study assessing the viability of virtual tourism in the Philippines and determining the factors affecting the viability of virtual tourism in the Philippines. Hence, this study aimed to assess the factors that affect the viability of virtual tourism in the Philippines. It further determines which among the identified perceived benefits and challenges affect the viability of virtual tourism in the Philippines.

The success of virtual tourism in a destination can be affected by so many factors in a given destination. Hereunder, virtual tourism's perceived benefits and perceived challenges were further discussed, and hypotheses developed.

Perceived Usefulness

Bagus et al. (2020) claim that the concept of augmented wireless reality recently swept the technological world, generating tremendous interest in research, industry, and other sectors. It is further reiterated in the study of Talafubieke et al. (2021) that virtual reality has the potential to be the future of tourism. Still, it can only work hand in hand with natural tourism to be successful. The nature of virtual reality tourist products will have a significant impact on the present tourism sector. Tourists that experience Virtual Reality (VR) to select a holiday destination view VR as a tool to get a glimpse of the location, which helps manage expectations (Australia Tourism n.d.). Tourists view virtual reality as a tool that can bring a destination to life and entice visitors to visit places they would not have explored otherwise (Australia Tourism n.d.). Kim et.al., 2018, indicated that VR Tourism likewise affects the cognitive response of the tourist, which causes a motivation to visit the place presented (Kim et al., 2018). Yang et al. (2022) indicate that tourists' virtual tourism experiences allow them to sense new experiences instinctively. At the same time, this immersive experience heightens travelers' awareness while also arousing their inner curiosity. Shao et al. (2020) also noted that the function of Virtual Reality in tourism was favorable, with optimistic growth prospects. Furthermore, tourists' virtual tourism technology experiences stimulate their interest, satisfy their expectations, and boost their recognition and contentment. Hence, the tourist's excellent view of virtual tourism fuels tourists' intent to utilize virtual tourism technology.

H1a: Perceived usefulness benefits have a positive effect on the viability of Virtual Tourism in the Philippines.

Perceived Ease of Use

Ease of use implies that this technology will be free from effort. For example, the "Take it home" culture that originated in China caught the interest of potential visitors to use gadgets to access tourist attractions' attractive images or videos virtually and simultaneously communicate with knowledgeable tour guides in the comfort of the home (Li et al., 2021). Moreover, according to Ankomah and Larson (2017), the rapid development of ICT has led to the creation of newer technolo-

gies that extend tourist products and experiences into virtual tourism (VT). In the study of Sarkady et al. (2021), one of the advantages of virtual reality (VR) is that it makes tourist attractions more accessible. Destinations can be freely chosen, and physically constrained regions can be visited using virtual reality technology. Likewise, Leite et al. (2021) prove that accessibility is a critical feature of online goods that strive to give equal access to all users, regardless of their physical, intellectual, or cognitive limitations.

H1b: Perceived ease of use benefits have a positive effect on the viability of Virtual Tourism in the Philippines.

Tourist Motivation

Virtual tourism has the potential ability to provide visual and sensory information to prospective tourists. A tourist service cannot be tested in advance. However, the booking decisions of customers can be based on the descriptive information they get through different social media platforms as well as on the internet. With this, users can travel to the destination ahead of time, encouraging real-time travel (Berger et al., 2007).

On the other hand, virtual tours allow tourists to tour the destinations independently on their own time and at their own pace. It gives a sense of autonomy and personal connection to the tourists. (VIAR 2020). Moreover, Craig(n.d.) stated that virtual tourism decreases costs because product demonstrations will be done without personal meetings and expensive presentations. In addition, it can be conducted in different time zones without travel costs. However, despite the rapid development of technology, many tourists still agree that traditional tourism materials (e.g., brochures) still significantly impact the decision-making process of purchasing tourism products and services (Băltescu, 2019). In addition, the expense of VR equipment restricts their utilization. Vishwakarma et al. (2020) have shown that the higher the costs of virtual technology, the less eager customers are to adopt virtual tourism.

H1c: Tourist motivation benefits have a positive effect on the viability of Virtual Tourism in the Philippines.

Promotion

Virtual tourism provides imagery that heavily benefits tourism marketing, campaigns, and promotions (Aziz & Zainol, 2011). Virtual reality (VR) is a strategic tool marketers use to enhance the transmission of emotions and experiences, attracting consumers and tourists. VR is frequently utilized due to its capacity to produce and accentuate emotional and sensory experiences (Pestek & Sarvan, 2021). With 360-degree video innovation in virtual tourism, destination marketers can create campaigns that provide their customers with virtual exposure before their trip (Rahimizhian et al., 2020). Kiliç et al. (2019) stated that brochures are more effective in the process of advertising. Comparing the brochure and virtual reality Model revealed that perceived service quality has more mediating effects on virtual reality. In contrast, brochures are more effective in converting participation into behavioral intention, especially during the advertising attitude phase. Likewise, Chiguvi and Madondo (2019) prove that traditional media, particularly in the domestic market, is still flourishing in promoting tourism in this digital age.

H1d: Promotion benefits have a positive effect on the viability of Virtual Tourism in the Philippine

Sustainability

Virtual tourism has less impact on the environment. Traveling can produce massive emissions but can be minimized when the tourist does not travel. Virtual tourism can help to lessen CO2 emissions because it does not need modes of transportation. It can make less garbage and less disruption to natural ecology and wildlife as well as less flora and fauna (Utheim, 2020). Indeed, virtual tourism is considered one of the unique technologies that protect the ecosystem rather than harm it.

The use of virtual tourism has a significant impact on spreading sustainable awareness and reducing greenhouse gas emissions. Furthermore, virtual tourism is seen as a feasible tool for promoting the long-term viability of tourist sites, not only in terms of the environment and culture but also in terms of the economic component of host communities through the creation of alternative sources of revenue (Lu et al., 2021).

H1e: Sustainability benefits have a positive effect on the viability of Virtual Tourism in the Philippines

Social Interaction

According to Guttentag, (2010), virtual reality technology utilized by some tourism and hospitality, and travel companies demonstrated tourists' hotel locations and spots with the help of 3D Videos. However, this VR technology brings a significant gap and limits social interaction between tourism and hospitality service providers and tourists. Furthermore, virtual tourism decreases the time spent interacting with people and things in the real world since everything is done virtually (Point in Time 2018). In the study of Rogers et al. (2021), social interaction through new and enhanced technology-mediated communication, as well as creative extended reality technologies such as augmented reality (AR) and virtual reality (VR), has become a staple in an ever-changing society. Face-to-face interaction is what most people are familiar with and prefer over computer-mediated communication. However, the VR interaction made them feel the most at ease and relaxed.

H2a: Social Interaction challenges have a negative effect on the viability of Virtual Tourism in the Philippines

Security

Virtual tourism is made possible by the internet and technology. Encountering small malware attacks can disrupt software programs and even the operation conducted virtually by service providers (Murphy et al., 2017). In addition, there will be issues regarding legal regulations and personal data protection, as every transaction will be done virtually (Ivanova, 2019). Virtual reality technologies are embraced by corporate environments, agencies, and other organizations. With this, a virtual environment is exposed to security risks. In virtual tours, security concerns feature improperly protected users' personal information. (Teppler 2016).

Security is defined as a method of ensuring data integrity, confidentiality, and availability when needed. Perceived security is characterized as the degree of consumers' security from such "threats." For example, VR systems have previously been proven to collect new user data. When the user believes the device is turned off, some data can be obtained because many headsets and gadgets are still turned on, allowing developers to collect data without the users' awareness. This data can then be sold and leaked to third parties through known vulnerabilities, affecting the quality and pricing of user-advertised items and services (Ismadi et al., 2020) and (Chirisa et al., 2020).

H2b: Security challenges have a negative effect on the viability of Virtual Tourism in the Philippines.

Navigation

To achieve an immersive experience in virtual tourism, navigation plays an important role. However, there are navigation issues that virtual tours continuously encounter. The difficulty and slow movement through virtual space are considered huge problems encountered by the users. Moreover, turning around to different virtual space areas was truly effortful. Since then, video games have progressed rapidly. However, virtual is still fixed in a similar interaction model that includes the following aspects: loading times of navigation are slow, there are too many navigation controls, and several areas with 360-degree virtual tour coverage are often restricted. In addition, too many navigation-arrow signifiers lead to confusion among several participants (Laubheimer, 2020).

Olbrich et al. (2015) stated that VR must be able to reduce the communication barrier between users and the system. Nevertheless, some gaps still need to be filled in the future to attain physical acceptability comparable to a touchscreen. Space, Feedback from the output, Input Recognition, and Voice Dialogue are the navigation challenges listed.

H2c: Navigation challenges have a negative effect on the viability of Virtual Tourism in the Philippines.

Materials and Methods

This study is a quantitative type of research utilizing the causal research design. Quantitative research focused on the process of collecting and analyzing numerical data (Bhandari, 2021). On the other hand, a causal research design is conducted to assess the impacts of specific changes on existing norms, various processes, etc. (Zikmund et.al., 2012).

The population of the study is comprised of tourists who visited an attraction or destination in the Philippines. To facilitate PLS-SEM analysis, the research sample size was calculated based on the recommendations of Hair et al. (2013). The sample size was calculated using the G*Power 3.0 software program (UCLA) with a power of .80, a medium effect size of 0.15, and alpha set at .05 for multiple regression of the maximum number of variables in a construct in our research framework, with 4 predictors used. A minimum sample size of 129 was necessary. On the other hand, the sample size determination by Hair et al. (2013), a sample size of 137 is needed when the maximum numbers of arrows pointing to a construct are 4, and the significance level is set at 5% and the minimum R2 is at 0.10. Comparing the results of both test and to account for possible incomplete data and refusal in the submission or return of the research instrument, the researchers opted to make the sample size 144.

In addition, the researchers utilized purposive sampling, and the respondents are of legal age and have visited an attraction or destination in the Philippines.They were chosen since they will help to assess the viability of virtual tourism in the Philippines as well as to determine the factors affecting the viability of virtual tourism in the Philippines.

A researcher-made survey questionnaire consisted of four (4) parts - demographic profile of the respondents, perceived benefits of virtual tourism, perceived challenges of virtual tourism, and viability of virtual tourism in the Philippines to tourists. The survey questionnaire used a five-point Likert Scale where one (1) means not agree, and five (5) means strongly agree.

Following the quantitative approach being used in the study, the survey questionnaires were made by researchers guided by different literature and studies. In connection, the formulated questions were then aligned based on the research questions and main objectives of the study.

The research instrument of this study was divided into four parts namely, the demographic profile of the respondents, perceived benefits of virtual tourism, perceived challenges of virtual tourism and viability of virtual tourism in the Philippines to tourists.

The variables, indicators, and references are listed in the following table.

Table 1. Sources of indicators for factors affecting virtual tourism

Variables	Indicators	References
Perceived Benefits of Virtual Tourism	**PERCEIVED USEFULNESS OF VIRTUAL TOURISM**	Bagus, Brahmasari, Suryani, 2020; Australia Tourism, n.d.; Kim et al., 2018; Subramani and Ambrose, 2020
	PERCEIVED EASE OF USE OF VIRTUAL TOURISM	Department of Information and Communications Technology, 2021;

Variables	Indicators	References
		Fonseca, 2021; Li et al., 2021; Ankomah & Larson, 2017
	TOURIST MOTIVATION	Knowledgenile, n.d; Business World Innovative Technologies, 2019; Kim, Lee, and Jung, 2018; El-Said and Aziz, 2021; VIAR, 2020; Craig, n. d
	PROMOTION	Aziz and Zainol, 2011; Pestek & Sarvan, 2021; Rahimizhian et al., 2020; Huang et al., 2016;
	SUSTAINABILITY	Utheim, 2020;
Perceived Challenges of Virtual Tourism	**SOCIAL INTERACTION**	Guttentag 2010; Point in time, 2018; Negrão, 2020;
	SECURITY	Murphy et. al., 2017; Teppler, 2016; Roman, Zhou and Lopez, 2013
	NAVIGATION	Laubheimer, 2020; Marton, Agus, Gobbetti, Pintore & Rodriguez, 2012

The research instruments passed through content validation of experts from the field of tourism and information technology. A validation form was accomplished by the jurors in evaluating the validity of questions to ensure that these are correct and essential to be included in the questionnaire. The research instrument was then revised according to the evaluation and final recommendation of the jurors.

On the other hand, this study utilized PLS-SEM method, evaluations of the research instrument wherein validity and reliability tests were included as part of the actual testing. The results of the validity and reliability tests were as follows:

Table 2. Convergent Validity and Reliability Tests

Perceived Benefits of Virtual Tourism	Factor Loading	Average Variance	Composite	Cronbach's Alpha
Perceived Usefulness of Virtual Tourism		0.657	0.869	0.905
PU1 Virtual tourism stimulates the curiosity of the tourists.	0.778			
PU2 Tourists who experience virtual reality can get a glimpse of the location which helps manage expectations.	0.833			
PU3 Virtual tourism affects the cognitive response of the tourist towards visiting a destination.	0.805			
PU4 The visuals and videos in virtual reality can fuel the attention of tourists.	0.843			
PU5 Tourists view virtual reality as a tool that can bring a destination to life.	0.792			
Perceived Ease of Use of Virtual		0.615	0.895	0.918

Tourism				
PEOU1 The virtual tourism platform is accessible for all tourists.	0.73			
PEOU2 The virtual tourism platform is easy to use.	0.747			
PEOU3 The information in the virtual tourism platform is easy to find and understand.	0.804			
PEOU4 Virtual tourism is convenient to use with any type of gadget.	0.794			
PEOU5 Learning to use the virtual tourism platform is easy.	0.815			
PEOU6 Using the virtual tourism platform does not require a lot of mental work.	0.801			
PEOU7 The virtual tourism platform is reliable and available.	0.792			
Tourist Motivation		0.633	0.883	0.912
TM1 Tourists will have prior knowledge in attractions before visiting in real-time.	0.731			
TM2 Virtual tours utilize creative tools that tourists can learn more even without a tour guide	0.833			
TM3 Virtual interactivity, experience, and immersion can influence a tourist's attitude towards the destination.	0.851			
TM4 Virtual tourism can give the tourist a sense of the ambiance in a location that encourage tourists to visit the destination.	0.818			
TM5 Virtual tours allow tourists to tour the destinations independently on their own time and at their own pace.	0.802			
TM6 Virtual tourism decrease cost because product demonstration will be done without personal meetings and expensive presentation.	0.729			
Promotion		0.73	0.877	0.915
PRO1 Virtual tourism provides virtual imagery that heavily benefits tourism marketing, campaigns, and promotions.	0.867			
PRO2 Virtual reality is a strategic tool used by marketers to enhance the transmission of emotions and experiences.	0.873			

PRO3 With the 360-degree video innovation in virtual tourism, destination marketers can create campaigns that provide customers a virtual exposure before their actual trip.	0.833			
PRO4 A virtual experience in the field of tourism is seen as a medium to promote various destinations.	0.845			
Sustainability		0.725	0.874	0.913
SUST1 Virtual tourism can help to lessen CO2 emissions because it doesn't need modes of transportation.	0.823			
SUST2 Virtual tours can be a viable alternative to visiting protected natural sites and tourist spots.	0.855			
SUST3 Virtual tourism boosts the destination's sustainability.	0.861			
SUST4 Virtual tourism can bridge the gap between commercial profit and the need for conservation.	0.867			
Perceived Challenges of Virtual Tourism	**Factor Loading**	**Average Variance**	**Composite**	**Cronbach's Alpha**
Social Interaction		0.622	0.797	0.868
SI1 Virtual tourism brings a major gap and limits social interaction from the provider of tourism and hospitality services to the tourist.	0.803			
SI2 Virtual tourism decreases the time spent interacting with people and things in the real world.	0.81			
SI3 Virtual tourism is an individual experience and gives the tourist the feeling of isolation.	0.771			
SI4 Tourists are unable to get instant feedback because it lacks opportunities to interact naturally.	0.769			
Security		0.824	0.929	0.949
SEC1 Small malware attacks in virtual environment can disrupt the software programs.	0.902			
SEC2 Security concern in virtual tours feature improperly protected of user's personal information	0.889			
SEC3 Security attacks in virtual reality learning environment can compromise	0.913			

performance and integrity.				
SEC4 Malicious activities that carried out by attacker to crash virtual reality sessions	0.927			
Navigation		0.642	0.859	0.899
NAV1 Slow and difficult movement through the virtual space.	0.734			
NAV2 Too much navigation controls and signifiers that leads to users' confusion.	0.828			
NAV3 Loading times of navigation in virtual tours are slow.	0.851			
NAV4 The inaccuracy of input system in virtual reality can cause error or delay in feedback to users.	0.811			
NAV5 Without precise use of language in voice command navigation, users will feel frustrated and lose interest in continuing the virtual tours exploration.	0.776			
	Factor Loading	**Average Variance Extracted**	**Composite Reliability**	**Cronbach's Alpha**
Viability of Virtual Tourism in The Philippines to Tourists		0.688	0.908	0.929
VIA1 I believe that virtual tourism can be an alternative way of promoting Philippine tourism	0.79			
VIA2 I believe that the potential of having virtual tourism in the Philippines have a great chance of growth	0.763			
VIA3 I will enjoy exploring Philippine attractions and destinations through virtual tourism	0.867			
VIA4 I am inclined to avail of virtual tourism services in the future	0.892			
VIA5 I am interested to experience virtual tourism at the comfort of my home	0.861			
VIA6 The booming trend of virtual tourism may catch the interest of potential tourists in the Philippines	0.796			

All item loadings are significant at 0.001 ($p<0.001$).

Table 2 presented the convergent validity and reliability tests. The coefficients of Cronbach's Alpha (CA) and Composite Reliability (CR) in the indicators of perceived benefits of virtual tourism, perceived challenges of virtual tourism, and viability of virtual tourism in the Philippines to tourists – have values higher than 0.7, and, thus, are highly reliable. As for the composite reliability,

since the CA and CR are close, this implied that they measure the same single construct, have exactly the same factor loadings, and do not have error covariances.

A measurement of a research instrument is said to have a good convergent validity if the respondents, as well as the designers of the research instruments, have the same understanding of all the question statements (or other measures) of each latent variable. In connection, for concluding the measurement model has acceptable convergent validity the p-values associated with the loadings must be equal to or lesser than 0.05; and that the loadings be equal to or greater than 0.5 (Hair et al., 1987; 2009; Kock, 2014a).

Likewise, all item loadings are significant at <0.001 and the values of the individual loadings are higher than 0.5. This indicates that all latent constructs or variables such as perceived benefits of virtual tourism, perceived challenges of virtual tourism, and viability of virtual tourism in the Philippines to tourists are within the acceptable thresholds for convergent validity.

The survey was conducted online using Google Form starting April 2022 until May 2022. The researchers asked for the consent of the respondents particularly the tourists who visited an attraction and/or destination in the Philippines. Through the letter of consent, they were assured of the confidentiality of all personal information and responses that were provided. In addition, the purpose of the study was explained to the respondents. The researchers also provided an e-mail address where respondents can send inquiries and questions about some items that needed clarification. Upon completion of the required number of respondents, the survey questionnaires were immediately retrieved and tallied by the researchers utilizing Frequency Distribution or Percentage as well as the PLS-SEM Method. The data collected from survey questionnaires were then analyzed and interpreted.

For an in-depth analysis of the data gathered in this study, different statistical tools were used. Descriptive statistics were used to describe the demographic profile of the respondents while inferential statistics were used for reliability, and validity as well as the relation between different factors affecting user satisfaction and continuance intention.

To interpret the data pertaining to the profile of the individual participants the frequency distribution or percentage was used. Frequency distribution is a representation of a display number of observations in a stated interval (Young, 2020). The researcher opted to use this as the results can be presented in either graphical format or tabular so that readers can readily analyze a described sample rather than reading an individual quantitative statement (Allen, 2017). This was used in this study to report the distribution in terms of age, gender, and nationality of the respondents, particularly the tourists in the Philippines.

Formula:

$$P = \frac{f}{N} \text{ X } 100$$

Where:
P = is the Percentage
f = is the frequency
N = is the total number of respondents

To test the hypotheses of the study, partial least squares – structural equation modelling (PLS-SEM) was utilized using WarpPLS 7.0. Since the present study involves model development and prediction, PLS-SEM is an appropriate statistical test. This statistical tool is best used since this study involves explorations of effort expectancy, performance expectancy, service quality, trust, and

continuance intention, and level of satisfaction which would be particularly effective in examining their complex relationships (Muller et al., 2018). Moreover, numerous studies use this method in determining factors affecting satisfaction and continuance intentions in relation to online food ordering and delivery system (Ali, et al., 2021; Troise, et al., 2021; Yeo, et al., 2021; Choi, 2020; Suhartanto, et al., 2019).

The assessment of the PLS-SEM results includes evaluations of the measurement model and the structural model. In the evaluation of the measurement model, validity and reliability tests are included. On the other hand, evaluation of the structural model entails the assessment of collinearity, path coefficients of the model, coefficient of determination, effect sizes, and predictive relevance (Hair, et al., 2016; Samani, 2016).

Before full structural equation analysis was carried out, a test of each measurement model will be required to measure the association between the indicators and latent construct. The tests are intended to identify the significant items in each measurement model to be used in further analysis. To test the outer model, two different kinds of analyses were performed, where the initial PLS operation that employed boot strapping method with 1000 resamples created loadings, average variance extracted (AVE), weights, t-values and composite reliabilities for every measurement item corresponding to its hypothesized construct. For each measurement item, the loadings were evaluated.

An instrument is said to be reliable if the measures or items for each latent variable are understood in the same way by different participants (Kock, 2017). In the present study, both Cronbach's alpha (CA) and composite reliability (CR) were gauged. The acceptable coefficient for both CA and CR is 0.70 and above (Fornell & Larcker, 1981; Nunnally, 1978; Nunnally & Bernstein, 1994; Kock, 2014; Kock &Lynn, 2012). Moreover, Kock and Lynn (2012) identified a more relaxed criterion for the coefficient of CA and CR which is, one of the two reliability measures should be equal to or greater than 0.70.

The formula for Cronbach's alpha is:

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

Where:
N = the number of items.
$\bar{c}$ = average covariance between item-pairs.
$\bar{v}$ = average variance.

When it comes to validity measurements, both convergent and discriminant validity tests were performed. Discriminant validity is the degree to which there are differences between two constructs. An instrument is said to have a discriminant validity when the items or measures of each latent variable are not confusing with regard to their meaning, and it is well-understood by the respondents. On the other hand, convergent validity refers to the degree to which theoretically similar constructs are related to each other is given. An instrument is said to have a convergent validity when the respondents and the designer/s of the instrument have the same understanding with the items or measures of each latent variable under scrutiny (Kock, 2017).

Assessment of convergent validity includes the evaluation of the loadings of each item for every latent variable. To establish convergent validity, the factor loading of the indicator, composite reliability (CR) and the average variance extracted (AVE) have to be considered. The p-values of for each loading must be equal to or lesser than 0.05 and each loading must have a value of 0.5 and above (Hair et al., 2009; Kock, 2014; Hamid et al., 2017).

The formula for composite reliability is:

$$\rho_{c\xi j} = \frac{\left(\sum_{k=1}^{K_j} \lambda_{j_k}\right)^2}{\left(\sum_{k=1}^{K_j} \lambda_{j_k}\right)^2 + \Theta_{j_k}}$$

Where:

K_j is the number of indicators of construct ξ_j,

λj_k the factor loading of item i, and

Θj_k is the error variance of the k^{th} indicator ($k = 1, \ldots K_j$) of construct ξ_j

The average variance extracted can be calculated as follows:

$$AVE\xi_j = \frac{\sum_{k=1}^{K_j} \lambda_{j_k}^2}{\left(\sum_{k=1}^{K_j} \lambda_{j_k}^2\right) + \Theta_{j_k}}$$

Where:

K_j is the number of indicators of construct ξ_j,

λj_k the factor loading of item i, and

Θj_k is the error variance of the k^{th} indicator ($k = 1, \ldots K_j$) of construct ξ_j

For confirmations of discriminant validity of the constructs, the Fornell-Larcker Criterion will be used where the average variance extracted (AVE) values must be above 0.4 and that the square roots of AVE for each LV must be more than absolute correlations between these variables. Additionally, discriminant validity assesses the correlations among variables with square roots of AVE coefficient (Kock, 2017). For every latent construct, the square root of the AVEs should be greater than any of the correlations involving the said variable (Fornell & Larcker, 1981).

$$\sqrt{AVE\xi_j} \geq \phi_{ij} \; \forall i \neq j$$

In short, the diagonal values must be greater than any of the values to their left or right in the same row (Kock, 2017).

$$AVE\xi_j \geq \phi_{ij}^2 \; \forall i \neq j$$

Once the tests for reliability, validity, and multicollinearity pertaining to the measurement model are deemed acceptable, the next stage in PLS-SEM is to assess the structural model and its paths can be analyzed appropriately. This can be judged on the basis of the model's ability to foretell the dependent Latent Variables (LVs). This can be measured with the help of path coefficients, p-value, and the effect size f2.

Path coefficients and respective P values are shown together. The P values shown were calculated through one of several methods available, and are thus method-specific; that is, they change

based on the P value calculation method chosen. In the calculation of P values, a one-tailed test is generally recommended if the coefficient is assumed to have a sign (positive or negative), which should be reflected in the hypothesis that refers to the corresponding association (Kock, 2015a). Hence the PLS-SEM reports one-tailed P values for path coefficients; from which two-tailed P values can be easily obtained if needed (Kock, 2015a). The p-values of for each loading must be equal to or lesser than 0.05 and each loading must have a value of 0.5 and above (Hair, Black, Babin, & Anderson, 2009; Kock, 2014).

In addition, the values of the effect size (f2) were sought to determine the effect of a predictor construct on an endogenous latent construct. This helps determine the hypothesized relationships among information success, perceived ease of use, perceived usefulness, behavioral intention, and satisfaction to determine the path loadings between each pair of LVs, coefficient of determination value for the endogenous LV, and finally the t-value to test the significance of the assumptions.

Results and Discussion

The majority of the respondents were female, and Filipino (68.75%), aged 18-24 years old (86.81%), and mostly Filipino (99.31%). The results of the evaluation of the measurement of the research instrument and a summary of hypothesis testing were presented below.

Table 3. Indicators of Perceived Benefits of Virtual Tourism, Perceived Challenges of Virtual Tourism, and Viability of Virtual Tourism in The Philippines to Tourists (Evaluation of the Measurement Model)

	PU	PEOU	TM	PRO	SUST	SI	SEC	NAV	VIA
PU	**0.811**								
PEOU	0.527	**0.784**							
TM	0.722	0.621	**0.796**						
PRO	0.662	0.596	0.735	**0.855**					
SUST	0.633	0.632	0.705	0.694	**0.852**				
SI	0.536	0.445	0.583	0.545	0.605	**0.788**			
SEC	0.561	0.541	0.555	0.564	0.61	0.571	**0.908**		
NAV	0.417	0.463	0.396	0.409	0.418	0.486	0.566	**0.801**	
VIA	0.457	0.527	0.443	0.373	0.556	0.281	0.269	0.282	**0.829**

Note: Square roots of average variances extracted (AVEs) are shown on diagonal Legend: PU (Perceived Use), PEOU (Perceived ease of use), TM (Tourism Motivation), PRO (Promotion), SUST (Sustainability), SI (Social Interaction), SEC (Security), NAV (Navigation), VIA (Viability of Virtual Tourism)

For confirmation of the discriminant validity of the constructs, the Fornell-Larcker Criterion was used, wherein the diagonal values must be greater than any of the values to their left in the same row. Table 2 shows that the measures used in the study have discriminant validity. Furthermore, it implied that constructs differ from one another. To sum up, the discriminant validity can be accepted for this measurement model and supports the discriminant validity between the constructs.

PLS-Path Model Figure 1, Table 4 and Table 5 display the PLS path model and the direct effects of each structural path.

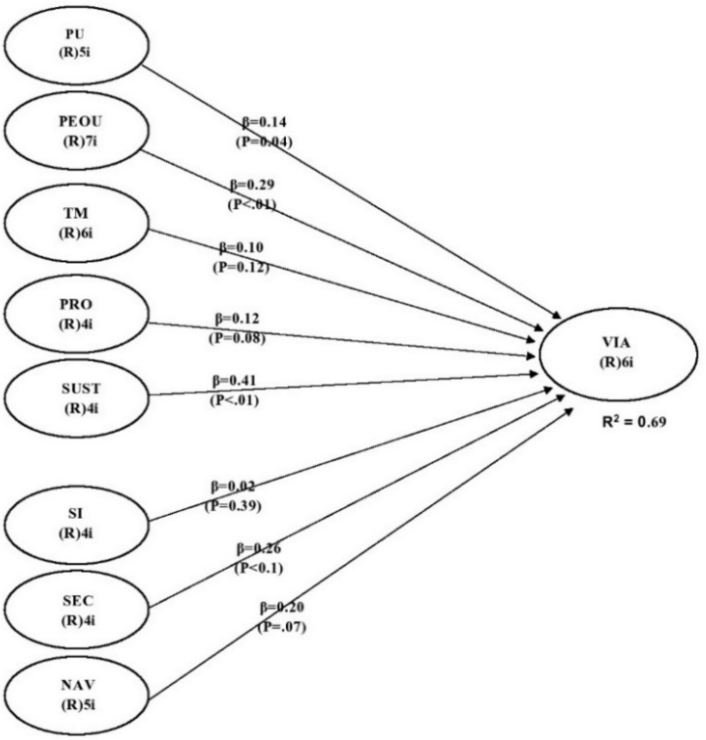

Figure 1. SEM Model

Hypothesis Testing

Table 4. Perceived Benefit Factors Affecting the Viability of Virtual Tourism in The Philippines

Hypothesis	Path Coefficient	P-value	Standard Error	Effect Size	Effect Size Int.	Interpretation	Decision
PU à **VIA**	0.142	0.041	0.081	0.065	Small	Significant	Supported
PEOU à **VIA**	0.285	<0.001	0.078	0.154	Medium	Significant	Supported
TM à **VIA**	0.096	0.121	0.082	0.047	N/A	Not Significant	Not Supported
PRO à **VIA**	0.117	0.076	0.081	0.045	N/A	Not Significant	Not Supported
SUST à **VIA**	0.405	<0.001	0.076	0.226	Medium	Significant	Supported

*f2 is the effect sizes (Cohen, 1988) where 0.02 = small, 0.15 = medium, 0.35 = large. Significance: *p < 0.001, <0.01, <0.05*

The findings revealed that the Perceived usefulness benefit shows a positive significant effect on the viability of virtual tourism in the Philippines (β= 0.142, 0.041) with a small effect size (f2=0.065); therefore, H1a is supported. This implies that the more useful virtual modality is to the tourist the more viable virtual tourism is. The rise of augmented wireless reality swept the technological world hereby generating interest in the field of research, industry, and innovation (Bagus et al., 2020) Yang et al. (2022) indicated that tourists' virtual tourism experiences allow them to instinctively sense new experiences. At the same time, this immersive experience heightens travelers' awareness while also arousing their inner curiosity. Furthermore, tourists' virtual tourism technology experiences stimulate their interest, satisfy their expectations, and boost their recognition and contentment. Sarkady et al. (2021), infer that one of the advantages of virtual reality (VR) is that it makes tourist attractions more accessible. Destinations can be freely chosen, and physically constrained regions can be visited using virtual reality technology. With this, the *perceived usefulness* of a heightened visitor experience through immersive technologies and accessibility of the destination this indicator should be considered a benefit factor affecting the viability of virtual tourism in the Philippines.

Regarding the effect of *perceived ease of use* benefits on the viability of virtual tourism in the Philippines, the result shows a positive significant effect was found (β= 0.285, <0.001) with a medium effect size (f2=0.154), hence H1b is supported. This implies that the less challenging the tourist experience using the technology the more viable virtual tourism will be. The use of this technology should be free from effort (Lee et.al., 2018). The “Take it home" culture that originated in China caught the interest of potential visitors to use gadgets to access tourist attractions' images or videos virtually and then simultaneously communicate with knowledgeable tour guides in the comfort of their home. Leite et al. (2021) prove that accessibility is a critical feature of online goods that strive to give equal access to all users, regardless of their physical, intellectual, or cognitive limitations. Moreover, according to Ankomah and Larson (2017), the rapid development of ICT has led to the creation of newer technologies that extend tourist products and experience into the sphere of virtual tourism (VT).

The Sustainability benefits have a positive significant effect on the viability of virtual tourism in the Philippines (β= 0.405, <0.001) with a medium effect size (f2=0.226), therefore, H1e is supported. This further implies that the more sustainable virtual tourism is to tourists, the more it may become viable. The use of virtual tourism has a significant impact on spreading sustainable awareness and reducing greenhouse gas emissions. Furthermore, virtual tourism is seen as a feasible tool for promoting the long-term viability of tourist sites, not only in terms of the environment and culture but also in terms of the economic component of host communities through the creation of alternative sources of revenue (Lu et al. 2021). Virtual tourism can help to lessen CO2 emissions because it will not need any mode of transportation. Likewise, it can cause less garbage, less disruption to natural ecology and wildlife as well as less flora and fauna wear. (Utheim 2020). Indeed, virtual tourism is considered one of the unique technologies that protect the ecosystem rather than harm it. With this, perceived *sustainability* benefits might support the viability of virtual tourism in the Philippines.

Tourist motivation benefits have no positive effect on the viability of virtual tourism in the Philippines (β= 0.096, 0.121), thus H1c is not supported. This implies that tourist motivation may not affect the use of virtual tourism in a destination. Talafubieke, et. Al, (2021) stated that the nature of virtual reality tourist products will have a significant impact on the present tourism sector, however, it should work hand-in-hand with real tourism products to be successful. Tourists that experience VR to select a holiday destination view VR as a tool to get a glimpse of the location, which helps manage expectations (Australia Tourism n.d.). Tourists view virtual reality as a tool that can

bring a destination to life and entice visitors to visit places they would not have explored otherwise (Australia Tourism n.d.). VR Tourism affects the cognitive response of the tourist, which causes motivation to visit the place presented (Kim et al., 2018).

Promotion benefits have no positive effect and are not significant on the viability of virtual tourism in the Philippines (β= 0.117, 0.076); thus, H1d is not supported. This implies that promotion is not one of the benefits considered by the respondents of the study affecting virtual tourism. According to Băltescu 2019; Kilic et al, 2019, traditional materials (e.g., brochures) still have a significant impact on the decision-making process of purchasing tourism products and services and are more effective in the process of advertising. For guests or customers, perceived service quality has more mediating effects on virtual reality while in contrast, brochures are more effective in converting participation into behavioral intention, especially during the advertising attitude phase. Aziz and Zainol, 2011, on the other hand, stated that virtual tourism provides virtual imagery that heavily benefits tourism marketing campaigns and promotions. This is further supported by the study of Pestek and Sarvan, 2021 and Rahimizhian et. al. 2020.

Table 5. Perceived Challenge Factors Affecting the Viability of Virtual Tourism in The Philippines

Hypothesis	Path Coefficient	P-value	Standard Error	Effect Size	Effect Size Int.	Interpretation	Decision
SI à **VIA**	0.022	0.394	0.083	0.008	N/A	Not Significant	Not Supported
SEC à **VIA**	0.261	<0.001	0.079	0.074	Small	Significant	Supported
NAV à **VIA**	0.2	0.007	0.08	0.072	Small	Significant	Supported

*f2 is the effect sizes (Cohen, 1988) where 0.02 = small, 0.15 = medium, 0.35 = large. Significance: *p < 0.001, <0.01, <0.05*

In terms of the effect of Security challenges on the viability of virtual tourism in the Philippines, the results show a positive significant effect on the viability of virtual tourism in the Philippines (β= 0.261, <0.001) with a small effect size (f2=0.074), therefore, H2b is supported. It implies that the respondent values security in virtual tourism. Security is defined as a method of ensuring the integrity, confidentiality, and availability of data when it is needed. Perceived security is characterized as the degree of consumers' security from such “threats”. VR systems have previously been proven to collect new user data. (Ismadi et al. 2020) and (Chirisa et al. 2020).

Virtual tourism is made possible by the internet and technology. Encountering small malware attacks can disrupt the software programs and even the operation conducted virtually by service providers (Murphy et.al. 2017). In addition, there will be issues regarding legal regulations and personal data protection as every transaction will be done virtually (Ivanova 2019). Virtual reality technologies are embraced by corporate environments, agencies, and other organizations. With this, a virtual environment is exposed to security risks. In virtual tours, security concerns feature improperly protected users ‘personal information (Teppler 2016).

Likewise, the analysis of the data shows that *navigation* challenges have a positive significant effect on the viability of virtual tourism in the Philippines (β= 0.2, 0.007) with a small effect size (f2=0. 072); thus, H2c is supported. This implies that navigation in virtual tourism might affect

its success. Olbrich et al. (2015) stated the need to reduce the communication barrier between users and the system itself. There are still some gaps that need to be filled in the future to attain physical acceptability, comparable to touchscreen navigation. Space, Feedback from the output, Input Recognition, and Voice Dialogue are the navigation challenges listed. This implied that *navigation* should be considered a challenging factor affecting the viability of virtual tourism in the Philippines

In order to achieve an immersive experience in virtual tourism, navigation plays an important role. However, there are navigation issues that virtual tours continuously encounter. The difficulty and slow movement through virtual space are considered huge problems encountered by the users. Moreover, turning around to different virtual space areas was truly effortful. Since then, video games have progressed rapidly. While virtual tours are still fixed in a very similar interaction model that includes the following aspects: loading times of navigation are slow, too many navigation controls and a number of areas with 360-degree virtual tour coverage are often restricted. Too many navigation-arrow signifiers lead to confusion among several participants (Laubheimer 2020).

The results on *social interaction* challenges on the viability of virtual tourism in the Philippines show no positive effect, and no significance was found (β= 0.022, 0.394); therefore, H2a is not supported. This implies that social interaction is not an issue in virtually the study of Rogers et al. (2021) social interaction through new and enhanced technology-mediated communication, as well as creative extended reality technologies such as augmented reality (AR) and virtual reality (VR), has become a staple in an ever-changing society. Face-to-face interaction is what most people are familiar with and prefer over computer-mediated communication. However, the VR interaction made them feel the most at ease, and relaxed. This implied that *social interaction* should not be considered a challenging factor affecting the viability of virtual tourism in the Philippines. Guttentag (2010) stated that virtual reality technology utilized by some tourism and hospitality as well as travel companies demonstrated tourists' hotel locations and spots with the help of 3D Videos. This brings a major gap and limits social interaction from the provider of tourism and hospitality services to the tourist.

Conclusion

Virtual tourism is viable in the Philippines and for Filipino tourists. However, its viability may be affected by the perceived benefit factors namely perceived usefulness, perceived ease of use, and sustainability, as these indicators showed positive significant effects. In contrast, two perceived benefit factors, tourist motivation, and promotion were found to have no positive effect and no significance on the viability of virtual tourism in the Philippines. Furthermore, virtual tourism in the Philippines is affected by perceived challenge factors such as security and navigation as these showed positive significant effects. The social interaction indicator, on the other hand, was found to have no positive significant effect on the viability of virtual tourism in the Philippines.

Hence, the destination and tourism planners should take into consideration indicators such as perceived usefulness, perceived ease of use, sustainability, security, and navigation when planning for the use of virtual tourism to ensure its success.

Future studies exploring the tourist behavioral factors that affect tourists' motivation and promotion of virtual tourism as well as the challenge factors such as the country's financial capability, destination, or attraction, and cultural factors that help assess virtual tourism's viability are recommended.

Acknowledgement

Foremost, the researchers would like to express their deepest gratitude to the following individual for their provision of valuable guidance in the preparation and completion of this research study.

To Dr. Lilibeth Aragon, beloved dean, who gave approval and recognition for conducting the research study.

To the research adviser, Dr. Jocelyn Y. Camalig., for the continuous support, patience, enthusiasm, and encouragement as he shares insightful comments to make this thesis possible.

To the panelists Mr. Heinz Pelayo and Mr. Allan Tang, who are the key persons in the accomplishment of this study. We express our sincere gratitude for allowing the researchers to improve their study with your shared knowledge in your expertise.

The researchers would also like to express their deepest gratitude to their parents for their financial support and friends and fellow students who have always been there for them throughout this venture and partake in the study's accomplishment.

Above all, the researchers would like to express their deepest gratitude to the Lord for giving them the strength, knowledge, and wisdom they need to accomplish their paper

References

Ankomah, P., Larson, T. (2017). *Virtual Tourism and Its Potential for Tourism Development in Sub-Saharan Africa.* Retrieved from https://www.researchgate.net/publication/318279697_Virtual_Tourism_and_Its_Potential_for_Tourism_Development_in_Sub-Saharan_Africa

Australia Tourism. (n.d.) Retrieved from http://www.tourism.australia.com/content/dam/assets/ document/1/6/y/7/t/2003897.pdf

Aziz, A., and Zainol, N.A. (2011), Destination image: and overview and summary of selected research (1974-2008), *International Journal of Leisure and Tourism Marketing*, *2* (1), 39-55.

Bagus, C., Brahmasari, I. A., and Suryani, T. (2020). *The effects of local culture on tourism Products and dosmestic tourist satisfaction in tourism destination. Arch. Bus. Res. 7*, 233-243. doi: 10.14738/abr.712.7560

Băltescu CA (2019) Do we still use tourism brochures in taking the decision to purchase tourism products? Annals of 'Constantin Brancusi' University of Targu-Jiu. *Economy Series, 6*, 110-115

Barnes, S. (2016), Understanding virtual reality in marketing: nature, implications and potential, *SSRN Electronic Journal.*

Berger, H., Dittenbach, M., Merkl, D., Bogdanovych, A., Simoff, S., & Sierra, C. (2007). Opening new dimensions for e-Tourism. *Virtual Reality*, *11*(2–3), 75–87.

Craig, A. (n, d.). *Main Benefits of Using Virtual Tour.* https://www.clickvirtualtour.com/articles/main_benefits.shtml

Chiguvi D, Madondo E (2019) *Assessment of the Effectiveness of Traditional Media for the Promotion of Tourism in This Digital Age in KwaZulu-Natal South Africa.* https://www.researchgate.net/publication/336946281_Assessment_of_the_Effectiveness_of_Traditional_Media_for_the_Promotion_of_Tourism_in_This_Digital_Age_in_KwaZulu-Natal_South_Africa. Accessed 20 October 2021

Chirisa I, Mutambisi T, Chivenge M, Mbasera M, Sidambe M, Muchenje B, Mukwashi T, Mabaso E, Ncube R, Zengeni D (2020) *Scope for Virtual Tourism in the Times of COVID-19 in Select African Destinations*

https://www.researchgate.net/profile/InnocentChirisa/publication/344126737_Scope_for_Virtual_Tourism_in_the_Times_of_COVID19_in_Select_African_Destinations/links/5f53a19b92851c250b9317fa/Scope-for-Virtual-Tourism-in-the-Times-of-COVID-19-in-Select-African-Destinations.pdf. Accessed 20 October 2021

Department of Information and Communications Technology. (2021). *PH climbs to 83rd spot in mobile internet speed for February 2021*. https://dict.gov.ph/ph-climbs-to-83rd-spot-in-mobile-internet-speed-for-february-2021/

Department of Science and Technology (DOST). (2016). *Science and Technology Competitiveness Rankings of the Philippines (2011 – 2017).*

Dragičević, M., & Bagarić, A. (2019). *Virtual Technology in Museums and Art Galleries Business Practice – The Empirical Research.*

El-Said, O.; Aziz, H. (2021). *Virtual Tours a Means to an End: An Analysis of Virtual Tours' Role in Tourism Recovery Post COVID-19.* https://journals.sagepub.com/doi/full/10.1177/004728752199756712/03/20/get-access-to-20-of-manilas-landmarks-in-this-new-virtual-tour

Google Arts and Culture. n.d.-b. *Home*. https://artsandculture.google.com/

Google Arts and Culture. (2021). *10 Museums You Can Explore Right Here, Right Now.* https://artsandculture.google.com/story/10-museums-you-can-explore-right-here-right-now/igKSKBBnEBSGKg

Guttentag, D.A. (2010), Virtual reality: applications and implications for tourism, Tourism *Management, 31*(5), 637-651.

Ismadi A, Rani N, Yusaini N, Zakaria M (2020) *Determinants of Behavioral intention on virtual tourism usage among tourist in Malaysia during COVID-19 Lockdown.* http://umkeprints.umk.edu.my/11958/1/GROUP%20T34.pdf. Accessed 20 October 2021

Ivanova, M. (2019), Robots, Artificial Intelligence, and Service Automation in Travel Agencies and Tourist Information Centers, Ivanov, S. and Webster, C. (Ed.) *Robots, Artificial Intelligence, and Service Automation in Travel, Tourism and Hospitality*, Emerald Publishing Limited, Bingley, pp. 221-237. https://doi.org/10.1108/978-1-78756-687-320191011

Joe, T. (2020). *Virtual Reality Travel Is Changing the Tourism Industry, But Is It Being Responsible?* https://thedope.news/virtual-reality-travel-is-changing-the-tourism-industry-but-is-it-being-responsible/

Kiliç İ, Doğantekin A Sari Y (2021) *The Effect of Brochure and Virtual Reality Goggles on Purchasing Intention in Destination Marketing*. https://dergipark.org.tr/tr/download/article-file/1252681. Accessed 20 October 2021

Kim, M., Lee, C. and Jung, T. (2018). Exploring consumer behavior in virtual reality tourism using an extended stimulus-organism-response model, *Journal of Travel Research*, *59*(2), 69-89

Kim, M.; Lee, C.; Jung, T. (2018). *Exploring Consumer Behavior in Virtual Reality Tourism Using an Extended Stimulus-Organism-Response Model.* Retrieved from https://journals.sagepub.com/doi/full/10.1177/0047287518818915

Laubheimer P (2020) *Virtual Tours: High Interaction Cost, Moderate Usefulness*. https://www.nngroup.com/articles/virtual-tours/. Accessed 30 September 2021

Leite M, Scatalon L, Freire A, Medeiros M (2021) *Accessibility in the mobile development industry in Brazil: Awareness, knowledge, adoption, motivations, and barriers.* https://www.sciencedirect.com/science/article/abs/pii/S016412122100039X Accessed 20 October 2021

Li, Y.; Song, H.; Guo, R. (2021). A Study on the Causal Process of Virtual Reality Tourism and Its Attributes in Terms of Their Effects on Subjective Well-Being during COVID-19. *Int. J. Environ. Res. Public Health, 18,* 1019. https://doi.org/10.3390/ ijerph18031019

Lu J, Xiao X, Xu Z, Wang C, Zhang M, Zhou Y (2021) *The potential of virtual tourism in the recovery of tourism industry during the COVID-19 pandemic*. https://doi.org/10.1080/13683500.2021.1959526. Accessed 20 October 2021

Murphy, J., Hofacker, C. and Gretzel, U. (2017), Dawning of the age of robots in hospitality and tourism: challenges for teaching and research, *European Journal of Tourism Research, 15*, 104-111.

National Academy of Science and Technology. (n.d.). *Harnessing Science and Technology for Poverty Reduction And Sustainable Development.* https://www.nast.ph/index.php/13-news-press-releases/249-harnessing-science-and-technology-for-poverty-reduction-and-sustainable-development

NYBG (New York Botanical Garden). (n.d.). *Virtual Workshops for Kids.* https://www.nybg.org/learn/virtual-workshops-for-kids/

Olbrich M, Keil J, Makiela T (2015) Heritage Move a Natural & Lightweight Navigation Schema for Low-cost, Non-stationary Immersive Virtual Environments. In *Digital Heritage, 1,* 289-292. IEEE.

Pestek, A. Sarvan, M. (2021). Virtual reality and modern tourism. https://www.emerald.com/insight/content/doi/10.1108/JTF-01-2020-0004/full/html

Point in Time. (2018, September 29). What Are the Positives & Negatives of Virtual Reality? https://pointintimestudios.com/what-are-the-positives-and-negatives-of-virtual-reality/

Rahimizhian, S.; Ozturen, A.; Ilkan, M. (2020). *Emerging realm of 360-degree technology to promote tourism destination*. https://www.sciencedirect.com/science/article/abs/pii/S0160791X1930747X

Rogers L, Broadbent R, Brown J, Fraser A, Speelman C (2022) *Realistic Motion Avatars are the Future for Social Interaction in Virtual Reality*. https://doi.org/10.3389/frvir.2021.750729

Santos, T. (2020, December 7). *DOT launches online tours of local destinations*. Inquirer. https://newsinfo.inquirer.net/1368717/dot-launches-online-tours-of-local-destinations

Sarkady D, Neuburger L, Egger R (2021) Virtual Reality as a Travel Substitution Tool during COVID-19. https://link.springer.com/chapter/10.1007/978-3-030-65785-7_44. Accessed 20 October 2021

Shao J, Bai H, Shu S, Joppe M (2020) *Planners' Perception of Using Virtual Reality Technology in Tourism Planning.* https://ertr-ojs-tamu.tdl.org/ertr/index.php/ertr/article/view/552/189. Accessed 20 October 2021

Shih, C.F. (1998) Conceptualizing Consumer Experiences in Cyberspace, *European Journal of Marketing 32*(7/8): 655–63.

Singapore Tourism Board. (2020). *Virtual Experiences: Immerse in 360° Experiences from Your Home.* https://www.visitsingapore.com/virtual-experiences/virtual-experiences-listing/

Sociéte d'Exploitation de la tour Eiffel. (2020). *A Virtual Tour of the Eiffel Tower.* https://www.toureiffel.paris/en/news/130-years/virtual-tour-eiffel-tower

Talafubieke, M.; Mai, S.; Xialifuhan, N. (2021). *Evaluation of the Virtual Economic Effect of Tourism Product Emotional Marketing Based on Virtual Reality.* Retrieved from https://www.frontiersin.org/articles/10.3389/fpsyg.2021.759268/full#B1

Teppler, S (2016) *Virtual Reality: Real Privacy and Security Risks.* https://www.databreachtoday.com/interviews/virtual-reality-real-privacy-security-risks-i-3221. Accessed 30 September 2021

UNESCO (United Nations Educational, Scientific and Cultural Organization), (2020). *Virtual Museums on Underwater Cultural Heritage Respond to the Covid-19 Crisis.* https://en.unesco.org/news/virtual-museums-underwater-cultural-heritage-respond-covid-19-crisis

Utheim, H. (2020, December 11). What is virtual tourism and when should you make use of it? *Travelopment.* https://travelopment.com/what-is-virtual-tourism-and-when-should-you-make-use-of-it/

Vatican News. (2020). *The Vatican Museums: Just a Click Away!* https://www.vaticannews.va/en/vatican-city/news/2020-03/vatican-museums-virtual-tours-coronavirus.html

VIAR. (2020). *Benefits of Using Virtual Tours to Attract Real Estate Buyers.* https://www.viar360.com/benefits-of-using-virtual-tours-to-attract-real-estate-buyers/

Virtual Tour of the Eiffel Tower. https://www.toureiffel.paris/en/news/130-years/virtual-tour-eiffel-tower

VRDirect. (2019, May 16). *Benefits of Virtual Reality in the Tourism and Travel industry*. https://www.vrdirect.com/blog/vr-for-tourism/benefits-of-virtual-reality-in-the-tourism-and-travel-industry/.