

ICONSPADU 2021**International Conference on Sustainable Practices, Development and Urbanisation****FACTORS AFFECTING VIEWERS' SATISFACTION IN VIRTUAL
ART EXHIBITION**

Muhammad Fitri Samsuddin (a)*, Mohd Hanif Mohd Omar (b), Aidah Alias (c),
Fazlina Mohd Radzi (d), Azmil Aswad Che Mat @ Mohd Shukor (e)

*Corresponding author

- (a) Faculty of Art & Design (FSSR), Universiti Teknologi MARA (UiTM) Alor Gajah, Melaka, Malaysia,
muhammadfitri@uitm.edu.my
- (b) Faculty of Art & Design (FSSR), Universiti Teknologi MARA (UiTM) Alor Gajah, Melaka, Malaysia,
hanifomar@uitm.edu.my
- (c) Faculty of Art & Design (FSSR), Universiti Teknologi MARA (UiTM) Alor Gajah, Melaka, Malaysia,
aidah637@uitm.edu.my
- (d) Faculty of Art & Design (FSSR), Universiti Teknologi MARA (UiTM) Alor Gajah, Melaka, Malaysia,
fazlinaradzi@uitm.edu.my
- (e) Faculty Design & Innovation, Limkokwing University of Creative Technology, Cyberjaya, Selangor,
aswad.shukor@limkokwing.edu.my

Abstract

The devastating effects of the COVID-19 global pandemic has forced most business transactions to shift from the conventional approach to the online medium to ensure their sustainability during this critical period. Artists are also transforming their approach from physical exhibitions to virtual exhibitions to ensure their business sustainability. Conventional or physical exhibitions draw large audiences; however, due to the COVID-19 global pandemic, such gatherings are strictly prohibited. Thus, virtual museum exhibitions will continue to be organised in the future, therefore, knowledge about factors that affect virtual exhibitions will be in demand. This cross-sectional study intended to examine the influence of technological, aesthetic and individual factors on viewers' satisfaction when experiencing a Virtual Art Exhibition. Data collection was carried out from May to June 2021 using an electronic questionnaire (google form) as a study tool, which was adapted from previous studies. Viewers of virtual art exhibitions were the unit of analysis and selected using the purposive sampling technique. Several virtual art exhibitions premiering in Melaka during the COVID-19 pandemic were identified. Data were analysed using the SPSS 27 software involving correlations and multivariate analyses. Findings reveal that only two factors were found to significantly influence viewers' satisfaction, namely the aesthetic value and individual (viewer) factors. This empirical evidence has outlined the fundamental aspects that will serve as a guideline for artists by considering the aesthetic value and individual factors in preparing for future virtual exhibitions as well as highlighting the importance of the technological factor in improving viewers' satisfaction.

2421-826X © 2022 Published by European Publisher.

Keywords: Aesthetic, Technology, Viewer's satisfaction, Virtual art exhibition



1. Introduction

1.1. Definition of a virtual art exhibition

Virtual exhibition (VE) is described as an online Web-based hypertextual dynamic collections offered to a certain theme, concept, topic, or idea, according to an early definition by Foo (2008). A digital exhibition, as defined by the Digital Exhibitions Working Group, is a collection of interlinks with the objective of sharing digital multimedia content in order to develop unique idea presentations with significant user interaction. A virtual art exhibition can be thought of as a well-organized collection of digital artwork delivered via multimedia that allows visitors to communicate and interact according to their requirements and interests. Pervasive computing makes objects available, but they don't have a physical location (Alawad et al., 2015). Virtual exhibitions are no longer seen as fleeting fads, but rather as a legitimate extension of real displays. The capacity to interact with several types of multimedia information on a single page, including image, audio, video, text, augmented reality, and virtual reality components, as well as the ability to reverse, revisit, translate, and read text written for a variety of users, all of these factors help to a better knowledge, perception, and learning of contents than actual exhibits.

An exhibition's goals include providing a public venue for the display of artefacts and serving as a knowledge centre specialised in a specific topic (Economou, 2004). From a didactic presentation of knowledge to a more open-ended public education show with aspects of entertainment, museum exhibitions have changed (Park, 2003). Conventional or a physical exhibition are events that involved large audiences. However, due to COVID -19 pandemic, such gatherings are strictly prohibited. This has led to restrictions for exhibition organisers and museum or gallery management when delivering their art works and continuing their businesses. However, their business transactions have shifted from physical exhibition to virtual exhibition to ensure their sustainability during the COVID-19 pandemic. In recent decades, museum spaces have incorporated new technologies to satisfy the diverse demands, learning styles, and visitor demographics. Museums today, particularly in western countries, are experimenting with numerous avenues of access to exhibitions for visitors, including computer-based option (Park, 2003). Due to this COVID-19 global pandemic, virtual museum exhibitions are expected to become a future phenomenon and further knowledge regarding the design of effective and efficient virtual art exhibitions is necessary. Another issue that has emerged is how viewing a virtual exhibit satisfies viewers in regard to virtual museum experience. To address the research problems, this study aimed to answer several research questions.

2. Literature review

2.1. Viewers' satisfaction on virtual exhibition

Evidence shows that in a virtual exhibition the degree of satisfaction is higher with the information provided, although there is also a strong inclination to utilise the information system based on VR technology again and again, and interviews provide an excellent rating on the overall experience of viewing a virtual exhibition (Izzo, 2017). The virtual environment was deemed to be both intellectually interesting and handy by the majority of users. One interesting observation was local visitors who

remotely accessed the exhibition, which they probably used for the first time, without encountering any problems in the process. Findings show that 70% of local visitor preferred a conventional or natural approach, compared to a minority of online visitors. This might be due to local visitors employing a gesture-based engagement device rather than the traditional mouse or keyboard input used by online visitors. In comparison to a standard computer screen, the environment was projected across a much broader area. Another online visitor commented that in virtual museums, the natural scale of an exhibit is simpler to appreciate because the viewer can compare it to other displays and the room.

Only a few visitors highlighted the navigation challenges and little information about the displays as downsides of virtual worlds (Vosinakis & Xenakis, 2011). Findings indicate that the majority of respondents (81.2%) showed enthusiasm in pursuing the website's theme. According to the results, respondents highly scored the perceived usability of both virtual display websites in relation to several factors, namely the navigation options and the website's captivating interface, general effectiveness of the delivery method, elucidative quality of the text, impact of the video clips, colour schemes, quality of the music, sound and photographs, layout, style, font of the text and, clarity of the explanations by the artists, curators, or narrators. The designs of the Virtual Smithsonian website received high ratings for navigation, organization, colour scheme, as well as the style and font of the text. The elements of music and sound received commendable remarks of being relevant and practical. The Ballgame website provided greater satisfaction to users as they enjoyed higher quality photographs, impressive video clip, clear and concise texts, display of text in various fonts and sizes and the colour scheme (Vosinakis & Xenakis, 2011).

2.2. Influence of the technology factors on viewers' satisfaction

Virtual exhibitions are no longer considered transitory styles but rather represent traditional exhibitions. The ability to captivate in numerous arrangements of interactive media on a single page, such as visual, sound, animated photographic, text, augmented reality, and virtual reality components, as well as the ability to reserve, re-visit, translate and look through the narrative for different users, assist in establishing a more profound sense of understanding, recognition, and learning of contents than tangible exhibitions. Many art galleries, including in universities, have introduced virtual exhibitions for their students to present their artwork. These networks have the potential to foster collaborations in interdisciplinary knowledge across geographical boundaries. The rapid pace of technology is also influenced by the rapid global pace moving towards Industry Revolution 4.0. Technology has transformed how art is created, conveyed and transmitted, allowing revolutionary artists and their inventive expressions to reach new audiences outside of the art world's traditional bounds. New technology leaves no field unperturbed, and art is no exception.

The incorporation of technology in virtual exhibitions has been applied in developing countries like China, Indonesia, Singapore, Saudi Arabia, and India. Malaysia is no exception in using technological approaches such as VR for exhibitions in museums and the use of social media for promotional purposes (Rahim et al., 2016). Perhaps the incorporation is still new and limited and needs to be improved (Rosli & Kamaruddin, 2020). However, effects of the Covid-19 pandemic have accelerated the process of incorporating technology for various purposes. Art exhibition activities pose a primary

function as a communication tool for artists and appreciators. This is consistent with Cline (2012), who found that the primary function of art exhibitions is to evoke the community's appreciation of art and a medium of communication between artists and visitors. It shows that art exhibition activity is necessary to fulfil the satisfaction of human behaviour. According to Ju (2020), satisfaction is a complicated concept that refers to the degree to which fundamental human needs are motivated by the Latin words "SARIS" and "FACERE", as discussed in behaviour and the lexical word meaning 'completion'. Viewer's satisfaction is the overall concept of evaluating a virtual exhibition. Viewers' satisfaction level can be measured based on information, system and aesthetic qualities.

2.3. The influence of aesthetic factors on viewers' satisfaction

Contemporary trends have witnessed an array of top-of-the-scale mobile technologies and innumerable mobile devices that represent every aspect of the multimedia spectrum, both when using data or otherwise, that goes on to help the successful launch of a virtual exhibition. A combination of information and system quality forms the aesthetic quality, which is a feature that not only evokes emotions, but also includes a system's function when applied in virtual exhibitions, such as usefulness, efficiency, effectiveness, learnability, satisfaction and accessible (Widjono, 2020). The process of producing a website or mobile application for a virtual exhibition is not only based on its operational capabilities but also aesthetic factors that play a significant role in shaping viewers' satisfaction in viewing in a virtual exhibition. According to Kim (2018), exhibitors and designers of virtual exhibitions need to understand visitors' needs in terms of their attributes, existing knowledge, history, and behavioral attributes during visitations.

2.4. The influence of the individual factors on viewers' satisfaction

Currently, the internet as well as information and communication technology (ICT) have penetrated our daily lives and permeated the mainstream culture in our society. COVID-19 has changed the way people live by diversifying technology and adapting new technology in life. Not to be outdone, there is also innovation that showcases artwork and a variety of other innovations with myriad of uses. Hence, several factors affect the influence of the individual factor on viewers' satisfaction when viewing a virtual exhibition. The individual factor that affects viewers' satisfaction while participating in a virtual exhibition, includes internet efficacy and viewers' attitude (Kim, 2018). In a virtual exhibition, the element of internet efficacy plays an essential role in determining the viewer's satisfaction. The practicality of internet efficacy as a communication channel is a crucial factor (Kim, 2018). High internet accessibility encourages viewers to revisit the virtual exhibition and this results in optimistic changes in behaviour and interaction (Castañeda et al., 2007; Kim, 2018). Conversely, it is not an easy task, and internet connectivity is well known for its usual hiccups, including limited data, difficulties in identifying data, and format size of the data for the artwork exhibit in the virtual exhibition, which viewers and curators encounter during a virtual visitation (Kim, 2018). According to Widjono (2020), flexibility and connectivity to virtual exhibitions help to gauge the effectiveness of the event organizer. Lin and Lu (2000), mentioned about the prominent factors affecting viewers' perception of connectivity and time response during a virtual exhibition. Therefore, virtual exhibition designers and curators need to design

and select the right presentation method that is informative and timely (Lin et al., 2020) as well as minimise heavy data usage to shorten the loading time (Chong et al., 2020; Kim, 2018).

Viewers' attitude is one of the essential elements that leads to viewers' satisfaction of the virtual exhibition. It requires viewers to get engaged in the work, make reversible or irreversible modifications through such contact, as well as create real-time and change creative effects, ultimately becoming a dynamic and multistate art form (Yu, 2010). According to Kim (2018), exhibitors and designers of virtual exhibitions need to understand visitors' needs in terms of their characteristics, prior knowledge, previous experience, and behavioural attributes during a visitation. It is particularly vital to understand visitor motivation and conduct because these are essential variables in communication amongst visitors that affects their attitude. Understanding the motivation to enhance a viewer's attitude is crucial when communicating with the virtual exhibition and its visitors and the features of space for socialization with avatars, virtual field excursions, and simulations located in the contents and contexts of learning (Carmo & Cláudio, 2013). Hence, creating virtual exhibitions and understanding user features requires dynamic, realistic, and interactive presentation methods and information technologies prior to understanding viewers' attitude. When they are able to understand and communicate while visiting the virtual exhibition, their experiences will become more realistic and efficient.

Consequently, internet efficacy and viewers' attitude are the two significant elements that promote and encourage viewers' satisfaction leading to revisitation or continued viewing of the virtual exhibition. Internet efficacy comprises high accessibility, flexibility, and the ability to connect with the virtual exhibition's interactive artwork and information. Viewers' attitude constitutes the enthusiasm, proactiveness, and initiative, which will lead to motivation, and optimistic changes in behaviour and interaction when a viewer is satisfied. Thus, this will lead to viewers' satisfaction regarding connecting to the respective channel, access to frequencies, visitor styles, dwell time, sequences of activities, and viewer's interaction pattern during visits to virtual exhibitions (Kim, 2018). Exploring digital technologies makes the virtual exhibition more flexible and enhances the value of the exhibition. It can overcome time, space limitations, and interactivity, which will improve viewer engagement and accessibility (Hu et al., 2020).

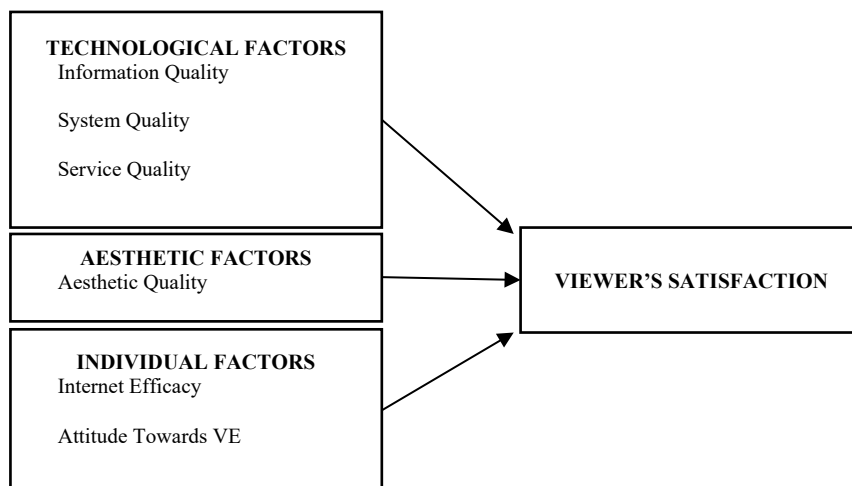


Figure 1. Research framework

3. Methodology

This quantitative study is based on descriptive and correlational methods. The descriptive method is purposely designed to investigate or gather information regarding an existing condition and it is also the "blueprint" of a research (Malhotra, 2009). Electronic questionnaires in the form of a Google form were used as the study tool. The questionnaire was adapted from previous studies and pre-testing was conducted to test the content validity that adequately measures the concept and face validity, to ensure that the questions are easily understood and measured. Viewers of virtual exhibition were recruited as a unit of analysis using the purposive sampling technique. The study chose a virtual art exhibition organised by Limkokwing University of Creative Technology to be attached as a link in the questionnaire to capture viewers' response, especially those who have no experience in viewing virtual art exhibition. This cross-sectional study was conducted from May to June 2021. A SEM analysis using the SMART-PLS software was performed to analyse data in two phases, namely measurement and structural modelling.

4. Result and discussions

4.1. Definition of a virtual art exhibition

The descriptive analysis in this study analyzed information related to respondents' (n=117) demographic profile. The respondents comprised individuals from the Klang Valley and Melaka who have experience in viewing virtual art and exhibition. Among these respondents, 45.3 percent were male, and 54.7 percent were female. The majority of these respondents were 29 years old and younger (55.6 percent), while the minority were aged 50 years or older (3.4 percent), implying that the younger generation favors virtual exhibition over the older generation. In addition, 62.4 percent of respondents were single (unmarried) and 95.7 percent were of Malay ethnic origin. As for the level of education, 44.4 percent of respondents had a Diploma, followed by a Master's Degree (40.2 percent), Bachelor's Degree (11.1 percent), PhD (3.4 percent) and lastly, SPM and below (0.9 percent). Approximately 55.6 percent had an income of RM3000 and below, followed by an income of RM3001-RM6500 (24.8 percent). With regard to the experience of viewing virtual art and exhibition, the majority (41.0 percent) had 1 – 2 experiences, followed by 32.5 percent having no experience at all and only 9.4 percent had viewed the virtual and art design exhibition on more than 5 occasions. In terms of respondents' background in the field of art and design, the majority (87.2 percent) were from the same industry, while only 12.8 percent were from the non-art and design background.

4.2. Assessment of the Measurement Model

This current study has achieved all the standard criteria for the measurement model. Firstly, the outer loading for all items have met the minimum threshold of ± 0.5 or greater (Hair et al., 2014). The variable composite reliability coefficient values ranged from 0.935 to 0.962, indicating that indicator's reliability in this analysis is above the standard acceptable level of 0.7 (Hair et al., 2011; Hair et al., 2018). The reliability coefficient also indicates that the measures are acceptable with internal consistency

(Peterson & Kim, 2013). Similarly, the Average Variance Extracted (AVE) range from 0.537 to 0.835 is more appropriate than the 0.50 threshold since an AVE value of more than 0.5 indicates that the construct accounts for more than 50% of the variance (Hair et al., 2018). In order to ascertain that the construct is empirically different from other constructs, the discriminant validity was tested (Hair et al., 2018). The HTMT criteria was used to test the discriminant validity of the research model. With the HTMT threshold value being 0.85, it indicates that discriminant validity has been established as the HTMT value is below 0.85 (Hair et al., 2014; Hair et al., 2017; Henseler et al., 2015).

4.3. Assessment of the Structural Model

The first step in the assessment is to examine the collinearity issues, which is measured by the Variance Inflation Factor (VIF). After the indicators of TSQ7, TSVQ2, and IIE4 were removed, the results indicate that the VIF values for all other predictors are below the threshold of five, indicating the absence of multicollinearity issues (Table 1). Probable collinearity issues could emerge when the VIF values exceed five, thus, the ideal VIF value is three or lower (Hair et al., 2018).

Table 1. Assessment of the Variance Inflation Factor (VIF)

	Viewer Satisfaction (VS) - VIF
Technological Factor (TF)	3.671
Aesthetic Factor (AF)	2.669
Individual Factor (IF)	2.460

The next assessment and the results of the structural path model are presented in Table 2. Results clearly indicate that the relationship between the technological factor (TF) and viewer satisfaction (VS) ($\beta = 0.190$, $p > 0.05$) are not significant. In contrast, the relationship between the aesthetic factor (AF), individual factor (IF) and VS were found to be significant with $p > 0.05$. In particular, the results indicate that the highest β value is IF with 0.447, which implies that the individual factor has the strongest influence on viewer satisfaction compared to AS with a β value of 0.336. Furthermore, the findings illustrated in Table 2 reveal that the R2 value in this study is 0.776 for the VS construct. This suggests that about 78% of the variance in viewer satisfaction can be explained by the combination of technological, aesthetic, and individual factors. According to Hair et al. (2017), R2 values of 0.75 are considered substantial, 0.50 is moderate, and 0.25 is weak. Therefore, referring to the rule of thumb by Hair et al. (2017), VS indicates substantial predictive power of the model. The effect size (f^2) was determined to indicate how the elimination of a given predictor construct affects the R2 value of an endogenous construct. As a guideline, values of 0.02 indicate small, 0.15 medium and 0.35 indicates large f^2 values (Cohen, 1988-cited in Hair et al., 2017). Findings reveal that the IF has a large effect, AF a medium effect, and TF a small effect on the VS. Next, the predictive relevance or Q2 value is 0.636 for viewer satisfaction. According to the present results, the predictive relevance value in the model is considerably above zero, thus, supporting the model's predictive relevance for the endogenous constructs.

Table 2. Hypotheses and full structural model

H	R/ship	β	t-value	p-value	Decision	f²	R²	Q²
H1	TF -> VS	0.190	1.353	0.088	Not Supported	0.044		
H2	AF -> VS	0.336	3.823	0.000	Supported	0.188	0.776	0.636
H3	IF -> VS	0.447	3.483	0.000	Supported	0.362		

Overall, visitors who participated in this virtual art exhibition expressed their support for its efficacy in terms of Aesthetic and the Individual Factors. Although there are constraints in terms of technology, they are constantly improved from time-to-time and undergo innovation. Technological innovation consists of adopting new technologies to be applied to products, services or production processes (Camarero & Garrido, 2008). Along with changes in time, technology will experience changes and be better than before. Nevertheless, the results obtained provide some optimism that this virtual art exhibition can be expanded and promises satisfaction to visitors.

5. Limitations

There are several limitations identified in this study. One of the limitations in virtual art exhibitions is the advanced interaction between visitors and artists, as well as, between visitors and artworks in the digital system. These interactions allow for lesser sensory inputs related to sight, touch, sound, smell, and taste. Visitors need to experience the process of interpreting, recognizing familiar patterns, and learning new knowledge when viewing a sculpture. Hence a virtual 360-degree video is recommended to enhance visitors' experience during virtual art exhibitions. These virtual videos can also create a virtual atmosphere and offer different access and perspectives for a wholesome experience (Horst et al., 2019). The implementation of Virtual Reality (VR) and Augmented Reality (AR) is a new emerging technology that should be considered in virtual art exhibitions.

6. Recommendations

One aspect of virtual art exhibitions is a visitor's interactive engagement with the artwork. To improve this engagement, artists should consider explaining the features of the artwork, which will allow the visitor to better understand the artwork from the artist's original perspective (Chan et al., 2016). Balint and Hall (2015) support this concept by stating that the human-object interaction model is required by designers or artists, objects or artefacts, and observers or viewers because as the observer sees the object, he develops a mental construct about it. Thus, an artist needs to research and capture visitors' reactions as they interact with the artwork during virtual exhibitions. Future studies should consider extending the function of digital mediums or technology platforms to provide artists, artworks, and visitors with satisfactory participation by ensuring a more effective and interactive exhibition experience, similar to a physical exhibition. Furthermore, while this study does not cover factors that include the application of virtual exhibition, development, and design for the virtual exhibition, these factors can help to broaden additional virtual exhibition studies and make it a multidisciplinary research topic.

7. Conclusions

This study offers relevant findings on the fundamental aspects of virtual art. Out of all three factors only two were found to be significant in influencing viewers' satisfaction. Visitors to this virtual art exhibition expressed their satisfaction through the aesthetic value and individual factor. Empirical evidence has outlined the fundamental aspects that serve as a guideline for the artist by considering the aesthetic value and the individual factor when preparing for future virtual exhibitions as well as highlighting the importance of the technological factor in improving their satisfaction since there will be rapid and innovative changes in technology. Thus, the technological factor appears to play a vital role in virtual art exhibition.

Acknowledgments

The authors would like to express their heartfelt gratitude to Universiti Teknologi MARA Melaka for funding this research through the TEJA Grant 2021 (GDT2021/2-8).

References

- Alawad, A., Aljoufie, M., Tiwari, A., & Daghestani, L. (2015). Beyond Geographical and Cultural Barriers: The Concept of a Virtual Gallery for Arts, Design & Architecture Schools in Saudi Arabia. *Art and Design Review*, 3(4), 87–93. <https://doi.org/10.4236/adr.2015.34012>
- Balint, T. S., & Hall A. (2015). Humanly space objects—*Perception and connection with the observer*. *Acta Astronautica*, 110, 129-144
- Camarero, C., & Garrido, M. J. (2008). The role of technological and organizational innovation in the relation between market orientation and performance in cultural organizations, *European Journal of Innovation Management*, 11(3), 413-434
- Carmo, M. B., & Cláudio, A. P. (2013). 3D virtual exhibitions. *DESIDOC Journal of Library and Information Technology*, 33(3), 222–235.
- Castañeda, J. A., Muñoz-Leiva, F., & Luque, T. (2007). Web Acceptance Model (WAM): Moderating effects of user experience. *Information and Management*, 44(4), 384–396. <https://doi.org/10.1016/j.im.2007.02.003>
- Chan, L. K., Geran K. S., Yuen K. S. G., & Lau, H. Y. K. (2016). Immersive Learning Environment for Visual Arts. International Conference on Augmented Reality, *Virtual Reality and Computer Graphics*, 231–240.
- Chong, H. T., Lim, C. K., & Tan, K. L. (2020). Users Experience with VR System: Current State and Development Directions. *TEST Engineering & Management*, 82(January-February 2020), 6429–6436.
- Cline, A. (2012). The Evolving Role of the Exhibition and its Impact on Art and Culture. *Trinity College Digital Repository*, 1–116.
- Economou, D. (2004). Virtual reality and Museums: The development of a collaborative virtual environment for learning about ancient Egypt. *Museology - International Scientific Electronic Journal*, 14(2).
- Foo, S. (2008). Online Virtual Exhibitions: Concepts and Design Considerations. *DESIDOC Journal of Library & Information Technology*, 28(4), 22–34.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (7th ed.). Pearson Education Limited.
- Hair, J. F., Hult, G. T. M, Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publications, Inc. USA.

- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *The Journal of Marketing Theory and Practice*, 19(2), 139–152.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2018). "When to use and how to report the results of PLS-SEM", *European Business Review*, 31(1). <https://doi.org/10.1108/EBR-11-2018-0203>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115–135.
- Horst, R., Diez, S., & Dorner, R. (2019). Highlighting Techniques for 360 Video Virtual Reality and Their Immersive Authoring. *Advances in Visual Computing, 14th International Symposium on Visual Computing*, ISVC, Lake Tahoe, NV, USA, Proceedings, Part I (pp. 515-526).
- Hu, Y., Sun, W., Liu, X., Gan, Q., & Shi, J. (2020). Tourism Demonstration System for Large-Scale Museum Based on 3D Virtual Simulation Technology. *Tourism Demonstration System*, 38(2), 267–381.
- Izzo, F. (2017). Museum Customer Experience and Virtual Reality: H.BOSCH Exhibition Case Study. *Modern Economy*, 8(4), 531-536. <https://doi.org/10.4236/me.2017.84040>
- Ju, S.-W. (2020). A Study on the Influences of Exhibition Experience, Satisfaction, Brand Assets and Behavioral Intention. *International Journal of Business Policy and Strategy Management*, 7(1), 31–38. <https://doi.org/10.21742/ijbpsm.2020.7.1.04>
- Kim, S. (2018). Virtual exhibitions and communication factors. *Museum Management and Curatorship*, 33(3), 243–260. <https://doi.org/10.1080/09647775.2018.1466190>
- Lin, C. L., Chen, S. J., & Lin, R. (2020). Efficacy of virtual reality in painting art exhibitions appreciation. *Applied Sciences (Switzerland)*, 10(9), 1–15. <https://doi.org/10.3390/app10093012>
- Lin, J. C. C., & Lu, H. (2000). Towards an understanding of the behavioural intention to use a web site. *International Journal of Information Management*, 20(3), 197–208. [https://doi.org/10.1016/S0268-4012\(00\)00005-0](https://doi.org/10.1016/S0268-4012(00)00005-0)
- Malhotra, N. K. (2009). *Marketing Research and Applied Orientation*. 7th Edition. Pearson Education Inc.
- Park, N. (2003). Virtual Museum Exhibitions: An Exploration of the Relationship Between Virtual Exhibitions and Visitors' Responses. *Electronic Theses, Treatises and Dissertations*. Florida State University Libraries.
- Peterson, R. A., & Kim, Y. (2013). On the relationship between coefficient alpha and composite reliability. *Journal of Applied Psychology*, 98(1), 194–198. <https://doi.org/10.1037/a0030767>
- Rahim, N., Wook, T. S. M. T., Zin, N. A. M., Rawi, N. A., & Muda, R. (2016). Usability evaluation of a virtual museum environment: Acase study in terengganu state museum, malaysia. *Advanced Science Letters*, 22(10), 2780–2784. <https://doi.org/10.1166/asl.2016.7109>
- Rosli, H., & Kamaruddin, N. (2020). *Visitor Experience's on Digital Media Technology for the Museum Exhibition in Malaysia : A Preliminary Findings*, VII(2), 245–248.
- Vosinakis, S., & Xenakis, I. (2011). A Virtual World Installation in an Art Exhibition: Providing a Shared Interaction Space for Local and Remote Visitors. *Conference: Re-Thinking Technology in Museums*.
- Widjono, R. A. (2020). *Analysis of User Experience in Virtual Art Exhibition During Pandemic*, 502(Imdes), 93–99. <https://doi.org/10.2991/assehr.k.201202.059>
- Yu, S. (2010). Study on artistic characteristics of virtual exhibition. *2010 IEEE 11th International Conference on Computer-Aided Industrial Design and Conceptual Design, CAID and CD'2010*, 2(2), 1163–1167. <https://doi.org/10.1109/CAIDCD.2010.5681997>