Adaptation of the e-servicescape model to the online exhibition industry

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Abstract

Purpose – *The servicescape model has been widely adapted in various service industries, but this model may not be applicable if the exhibition is transformed from physical to online. Moreover, there is only a handful of research on online exhibitions; studies focusing on visitor behaviors from various types of online exhibitions and the differences between genders are still lacking. This study aims to examine the different variables in the e-servicescape model and discuss how e-servicescape affects visitor behavior based on the exhibition types and gender differences.*

Design/methodology/approach – *The e-servicescape model is adapted in this study. Qualitative interviews were conducted prior to a quantitative online survey to examine by regression analysis the relationships among the dimensions in e-servicescape and how it affects visitor subsequent behavior. Data analyses are based on the differences between exhibition types and gender differences in response to the three environmental dimensions, namely, aesthetic appeal, layout and functionality, and security concern.*

Findings – *The findings show that visitors pay more attention to artistic enjoyment in art-related exhibitions and focus on informative issues in other types of exhibitions. "Aesthetic appeal" and "layout and functionality" are important to both genders, but little concern is shown to computer security issues. Female visitors are concerned with aesthetic design and male visitors stress layout and functionality elements. In terms of the security concerns, females have no concern about cookies function, while males have no concern on leaving search history on the website.*

Originality/value – *There is no previous relevant research on the relationships and influence between e-servicescape and online exhibition; this study focuses on the application of e-servicescape to the online exhibition industry and helps fill this research gap.*

Keywords *Aesthetic appeal, e-servicescape, Layout and functionality, Online exhibition, Security, Visitor behavior*

Paper type *Research paper*

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1. Research background

Online exhibitions began early in the internet era but were not very popular in the event industries; the main push factor to the recent surge in online exhibitions was the outbreak of COVID-19 (Hoffman, 2020). According to the World Health Organization (2020), COVID-19 has been classified as a global pandemic, and 73% of physical exhibitions were canceled due to regulations related to restrictions from the pandemic in 2020 (Statista, 2021). Under these circumstances, online exhibitions were widely promoted so that visitors can continue to participate.

Booms and Bitner (1981) developed the servicescape model explaining the influences of the physical environment on customer and employee behaviors. However, when physical exhibitions are transformed into online exhibitions, this servicescape model may no longer be applicable. The online platform is different from the physical environment, as it does not provide any physical features to influence customer responses and behaviors. An e-servicescape model with variables such as website aesthetic appeal and usability (Harris and Goode, 2010) may be more applicable to the online exhibition industry.

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As previous studies focused only on traditional physical exhibition or applying e-servicescape model to other industries, there is still a lack of studies on the e-servicescape model in online exhibition industry. Most studies focused on the servicescape and customer experience in physical exhibitions, for instance, the role of servicescape in convention and exhibition centers (Siu *et al.*, 2012), customer experience in exhibition products (Wu, 2021) and service blueprint and innovation in the convention and exhibition industry (Chiou *et al.*, 2012). Previous research applied e-servicescape model on other industries, such as hospital website (Hakim and Deswindi, 2015) or mobile banking application (Andriani *et al.*, 2021), but none has been conducted on online exhibitions yet. There is only a handful of research studies focusing on online exhibitions, such as the drawbacks (Shimray and Ramaiah, 2015) or the benefits of holding online exhibitions (Saiki *et al.*, 2012). Moreover, there is a lack of research on online exhibition visitor behaviors; to date, there is no study on different types of online exhibitions, and there are only a few studies on physical exhibition behaviors due to gender differences (Wu *et al.*, 2017; Park and Park, 2018). This study intends to fill this research gap by investigating the applicability of the e-servicescape model to online exhibitions and by examining how the dimensions of the e-servicescape model affect online exhibition visitor behavior. The results of this study can contribute to the academic theory and knowledge on e-servicescape, as well as make practical contributions to better understand consumer behavior in online exhibitions to meet with visitors' needs in the industry.

The research objectives are:

- to investigate the applicability of the e-servicescape model for online exhibitions;
- to explore online exhibition environmental dimensions by application of the e-servicescape model; and
- to explore online exhibition visitor behavior by application of the e-servicescape model.

2. Literature review

2.1 Exhibition industry

Exhibitions are part of the meetings, incentives, conventions and exhibitions (MICE) industry which includes fairs, trading and products demonstration (Huang and Chung, 2016). Another way to define "exhibition" is that it is the combination of exhibits and displays for public presentation (Dean, 2002). The exhibition industry has a strong collaboration with a variety of other industries, such as entertainment and transportation sectors. The industry contributes to the domestic income, visitor flow and employment opportunities. There were about 32,000 exhibitions recorded in 2018 (UFI the Global Association of the Exhibition Industry, 2020).

Exhibitions bring both positive and negative impacts to local society and exhibition stakeholders. For instance, huge expenses, damage to the natural environment, use of local resources, creating waste and pollution problems are negative impacts which may encourage the development of online exhibitions (ISO, 2012; Zamzuri, *et al.*, 2011). Moreover, the COVID-19 pandemic had a huge impact on all industries around the world, and the exhibition industry was no exception. For safety reasons, physical public exhibitions were forbidden in many countries (Amorim and Teixeira, 2021). According to the Center for Exhibition Industry Research (2020), 72.6% of events were canceled in the first quarter of 2020, which led to a 15.1% drop in industry performance when compared with 2019. Nevertheless, the changes in the event industry including exhibitions, in transforming from physical to online, provide a substitute under pandemic conditions (Rwigema and Celestin, 2020). Disimulacion (2020) has studied the relationship and impacts among COVID-19, the development trend of the exhibition industry and online exhibitions and found that under the pandemic, online exhibitions can easily reach a mass audience, with easy access to the

platform, and reduced costs for the stakeholders. However, it was found that there are only a few papers focusing on the online exhibition, and most of these were only on the design aspect of online exhibitions. There is still a lack of studies on the effectiveness, practicality and improvement of transferring physical to online exhibition; thus, this study intends to fill the research gap by providing more insights in relation to the applicability of e-servicescape on various types of online exhibition and the subsequent behaviors.

2.2 Servicescape model

The service environment can affect visitor and also employee attitudes and responses (Kotler, 1973). Especially, the service environment can influence visitor emotions which may increase their willingness to purchase (Baker *et al.*, 1992). Booms and Bitner (1981) proposed a servicescape model to demonstrate the cause-and-effect relationship between the physical environment and user behavior. The model included five major components, namely, environmental dimensions (ambient conditions; space or function; and signs, symbols and artifacts); the holistic environment of the perceived servicescape; the moderators of employee and visitor responses (cognitive, emotional and physiological responses); and the resultant behaviors from both employees and visitors. These five components have a connected relationship that may affect both employee and visitor responses and behavior during the service provision and receiving processes.

This servicescape model is helpful for service providers to measure and understand how to attract and provide a good experience for their users (Wakefield and Blodgett, 1996). Moreover, it can provide suggestions to service providers on the ways to differentiate themselves from competitors and increase their competitiveness (Lee, 2011). Likewise, positive responses from users can help in directing the success of the service industry in terms of building loyalty, image, revenue and satisfaction of both visitors and employees (Barich and Kotler, 1991). However, this servicescape model may only apply well in the physical environment with the five senses engaged, and it may need adjustment to be applied in the online environment when it turns into a virtual encounter without physical service.

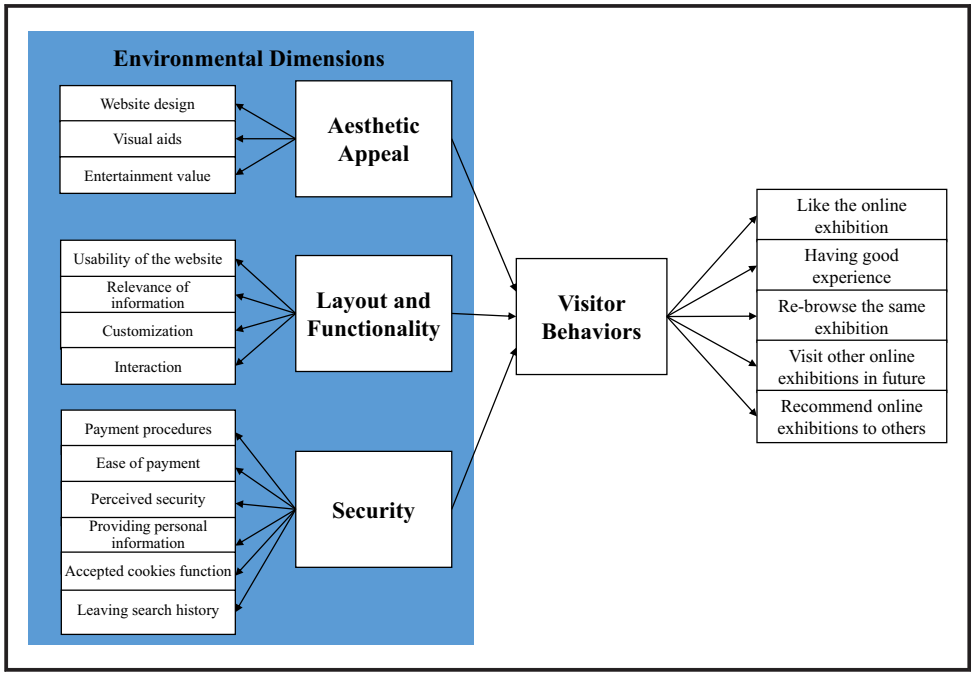
2.3 E-servicescape model

The development of technology has shifted the physical marketplace to an online marketplace (Ballantyne and Nilsson, 2017). The original servicescape model may be more suitable for service business with physical environments, such as restaurants, hotels and exhibition centers. Therefore, an e-servicescape model was developed to evaluate the environmental dimensions for online service environment via online platforms (Wu *et al.*, 2017), while m-servicescape model was developed for mobile phone applications specifically (Lee, 2018).

Over the years, several e-servicescape models were developed with various dimensions included. Jeon and Jeong (2009) created an e-servicescape model with four dimensions, namely, ambient conditions, design aspects, search aids and slogans, and functional aspects. Another e-servicescape model by Harris and Goode (2010) included three dimensions, namely, aesthetic appeal, layout and functionality, and financial security. This research adapts and consolidates these e-servicescape dimensions by Harris and Goode (2010) and proposes an e-servicescape model for the online exhibition industry (Figure 1).

2.3.1 Aesthetic appeal. Aesthetic appeal means a factor which will influence visitor perception and response to the environment that they are perceiving; it involves the five senses such as affected by lighting, music and temperature (Bitner, 1992). In the online world, it is hard to encompass all the five senses; however, the design of the website is remarkably important to attract visitors to come or stay. The positive impacts on visitor flow by aesthetic appeal have been proven in e-servicescape (Boukabiya and Outtaj, 2021).

Figure 1 Proposed e-servicescape model for the online exhibition industry



Also, it was found that ambient conditions have certain impacts on the website which in turn creates an effect on visitor response, and music is one of the most discussed elements (Baker *et al.*, 1992; Harris and Ezeh, 2008; Hopkins *et al.*, 2009). Visual aids on the website also affect visitor experience and include the website background pattern, the color used and the attractiveness (Eighmey and McCord, 1998; Jeon and Jeong, 2009). Entertainment value is another element considered as aesthetic appeal, which involves enjoyment and the enthusiasm (Tran *et al.*, 2012; Tankovic and Benazic, 2018). This research investigates if aesthetic appeal is important to visitors when visiting an online exhibition and how it affects visitor behaviors; elements such as website design, visual aids and entertainment value will be studied under this aesthetic appeal dimension.

2.3.2 Layout and functionality. The layout and functionality refer to the setting of the physical environment, such as how the equipment and facilities are placed and arranged in a service environment (Bitner, 1992). The layout and functionality of the online environment influences visitor behavior, such as visitor satisfaction and willingness to stay and purchase (Manganari *et al.*, 2011). Layout and functionality consist of the usability of the website, the quantity and quality of the information provided, customization and the connection between exhibition organization and visitors (Harris and Goode, 2010). Because the online environment is different from the physical environment, all of the settings of the exhibit, the floor plan and the function of each button will affect visitor online experience and, in the end, will affect their decision to stay or leave. Besides, interaction is one of the items in layout and functionality. Although there is no longer face-to-face interaction between employees and the customers in the online environment, it can be substituted by online interaction between the visitors and the website (Jeon and Jeong, 2009). Previous studies on layout and functionality in e-servicescape did not cover online exhibitions; thus, this study intends to find out the influences of the layout and functionality on visitor online experience through the usability, such as the operation of the website (Tran *et al.*, 2012; Tankovic and Benazic, 2018), relevance of information (Eighmey and McCord, 1998), interaction (Jeon and Jeong, 2009;

Tran *et al.*, 2012; Tran and Strutton, 2020) and customization (Tran *et al.*, 2012; Tran and Strutton, 2020) of the online exhibition.

2.3.3 Security. Online environment is more complicated when compared with the physical environment (Eroglu *et al.*, 2001). In other words, there are more security considerations when adapting the e-servicescape model. It is found that the perception of security strongly affects visitor satisfaction (Harris and Goode, 2010). However, previous studies looked at the security dimension mainly from the financial security perspective such as payment procedures, ease of payment and perceived security (Tran *et al.*, 2012; Huang *et al.*, 2017; Tankovic and Benazic, 2018; Tran and Strutton, 2020; Boukabiya and Outtaj, 2021). Other online security issues such as the security of providing personal information, the accepted cookies function and leaving search history have yet not been studied; thus, this study intends to examine these security issues within the e-servicescape model and its influence toward visitor behaviors.

2.3.4 Visitor behavior. Visitor behavior is influenced by the environmental dimensions and affects the resultant behavior, such as intention to revisit, willingness to stay longer and purchase decisions (Bitner, 1992). Boukabiya and Outtaj (2021) found that e-servicescape has a positive influence on the consumer online flow as well as the consumer purchase intentions in business-to-consumer e-commerce stores. Abarbanel (2013) found that negative response from users occurred when wrong information was navigated on online gambling environment services; it was also found that more elements, such as the effect of sound, the specific colors and operational efficiency, can be focused within the online environment to increase consumer satisfaction and may have significant influence on visitor response. Tran *et al.* (2012) found that online website usability, security, customization and entertainment value have positive influence on customer credibility, which in turn positively affect the patronage and eWOM intention of online retail websites. There is no previous study on visitor behavior toward different types of online exhibitions. Only a handful of research studies looked at the differences in visitor gender in response to servicescape elements. For instance, female visitors usually pay more attention to appearance, attractiveness, usability and customization in the online platform, while male visitors focus more on layout, functionality and cleanliness (Wu *et al.*, 2017; Park and Park, 2018). This study thus examines the diverse visitor behaviors based on the type of online exhibition and gender differences in response to subsequent behaviors such as rebrowsing the online exhibition, visiting other online exhibitions and recommending online exhibition to others based on the three dimensions in the e-servicescape model.

3. Methodology

This research adapted a sequential mixed method research. According to Palinkas *et al.* (2011), qualitative method helps to understand process, while a quantitative method helps to find out the implementation of outcomes; thus, both methods were adopted for the sake of more fruitful findings. Qualitative interviews were conducted and followed by an online quantitative survey. Qualitative findings can be used as evidence to support the statistical analyses made by quantitative data and to provide in-depth insights (Malina *et al.*, 2011). Semistructured interviews were conducted in February 2022 to obtain firsthand online exhibition visitor feelings, concerns and responses from their online exhibition visiting experiences. Three interviews were conducted by purposive sampling method via recorded international phone calls and face-to-face interviews. Each interview lasted from 20 to 40 minutes. Cantonese was used as interview language, the digital recording of the interviews was then transcribed and translated into English and the responses to the interview questions were analyzed by content analysis.

A quantitative online survey was then conducted to collect data from visitors who have visited any type of online exhibition in the past five years to assess visitor recollection ability. The survey adopted the five-point Likert scale and contained 38 questions of

e-servicescape dimensions, i.e. 10 questions for aesthetic appeal; 15 questions for layout and functionality; 7 questions for security; and 6 questions for visitor behavior, as well as demographic data, including the number of times the visitor has visited online exhibition in the past five years, the types of online exhibitions the visitor has ever visited and the most recent type of online exhibition visited for behavioral data analysis. There were a total of 106 valid completed surveys collected by snowball sampling, and a Google form link of the survey was sent to acquaintances via social media from late February to March 2022. Data were then analyzed by SPSS version 18 through regression analysis to examine the interaction of the three environmental dimensions and visitor behavior.

4. Findings and discussion

4.1 Demographic profiles of respondents

A total of 106 completed questionnaires were collected from the online survey, with more than half of the respondents having participated in different types of online exhibitions in the past five years (n = 62, 57.1%). Among respondents who have attended online exhibitions, 66% are female and 34% are male. The respondents are mainly from the age group 18–29 (62%), followed by age 50 and above (19%), age 40–49 (13%) and age 30–39 (6%). The types of online exhibitions that respondents have visited are grouped as art-related (50%) and nonart-related (50%), and these nonart-related exhibitions are, namely, business (27%), education (16%), sports (5%) and history (2%), respectively.

This study interviewed three online exhibition visitors who are aged between 21 and 40. These interviewees include one female designer (Interviewee A) who has visited art-related online exhibitions; one male undergraduate student (Interviewee B) who has visited several educational online exhibitions; and one male exhibition organizer (Interviewee C) who usually joins business-related of online exhibitions.

4.2 Differences between art-related exhibitions and nonart-related exhibitions

Website design or "aesthetic appeal" is considered as one of the influencing factors in online exhibitions. This can be explained by the nature of human sensory response based on the five senses (Agapito *et al.*, 2012). As Interviewee A mentioned, "as long as the online exhibition has a good design, of course it will catch my attention and I may be more willing to share the link with my other acquaintances."

The findings showed that visitors who attended art-related exhibitions put more emphasis on "aesthetic appeal" dimension. If visitor likes to visit an online exhibition, it may be due to the tidy design of the website (B = 0.900); when visitors have good experience, it may be influenced by the eye-catching website (B = 1.020) and its creative design (B = 0.900); while entertaining element (B = 1.038) may affect visitors to rebrowse the same online exhibition. Meanwhile, eye-catching website (B = 0.592) imposes influence on the visitor behavior of visiting other online exhibitions. Also, simple design website (B = 0.571) imposes impact to visitors by recommending the exhibition to the others (Table 1). The findings may indicate that some visitors attended art-related events mostly for leisure and fun purposes, and they intended to enjoy the beautiful exhibits in the online exhibition. Moreover, some of these visitors who attended these art-related online exhibitions are fine art professionals, thus "aesthetic appeal" dimension is the most important factor in presenting the professional art exhibits. The finding is supported by the comment from Interviewee A, "an attractive design is needed especially for the fine art online exhibition type, because that is what art exhibition should include." Therefore, "aesthetic appeal" dimension is suggested to be addressed and reinforced, especially on the art-related types of exhibitions, to attract visitors to revisit the same exhibition, to encourage the visitor to visit other online exhibitions and to recommend the exhibition to the others.

Table 1 Regression analysis on factors affecting visitors attending art-related and non-art-related online exhibitions

Variable	Art-related exhibitions B	Art-related exhibitions T	Art-related exhibitions VIF	Nonart-related exhibitions B	Nonart-related exhibitions T	Nonart-related exhibitions VIF
Like visiting online exhibition						
Constant	0.200	0.354		0.839	1.399	
Tidy design	0.900	6.573**	1			
Attractive design				0.743	4.005**	1.000
	R^2 = 0.844, F = 43.200**, D-W = 2.460			R^2 = 0.445, F = 16.039**, D-W = 1.858		
Having good experience						
Constant	0.020	0.034		−0.919	−1.214	
Eye-catching design	1.020	6.742**	1			
3D images or VR models show clearly				0.768	5.404**	1.007
Creative design	0.900	6.573**	1.000	0.440	2.832*	1.007
	R^2 = 0.850, F = 45.455**, D-W = 2.109			R^2 = 0.644, F = 19.974**, D-W = 2.229		
Re-browse the same exhibition						
Constant	−1.471	−2.569*		1.106	1.291	
Entertaining design	1.038	11.938**	1.021			
Inquire information are easy to use	0.422	7.183**	1.154			
Displayed personalized				0.617	2.503*	1.000
	R^2 = 0.973, F = 73.057**, D-W = 1.895			R^2 = 0.239, F = 6.507*, D-W = 1.915		
Visit other online exhibition in the future						
Constant	1.592	2.312*		1.532	2.945**	
Eye-catching design	0.592	3.406**	1.000			
Displayed personalized				0.585	3.911**	1.000
	R^2 = 0.592, F = 11.600**, D-W = 2.469			R^2 = 0.433, F = 15.299**, D-W = 1.596		
Recommend the online exhibition to others						
Constant	1.643	3.112*		−0.025	−0.029	
Simple design	0.571	4.021**	1.000	0.306	3.654**	1.069
Eye-catching design				0.642	2.369*	1.069
	R^2 = 0.669, F = 16.168**, D-W = 1.920			R^2 = 0.450, F = 7.788**, D-W = 1.952		

Notes: Significant at *$p < 0.05$; **$p < 0.01$; D-W = Durbin–Watson

Interestingly, the findings showed that the willingness of visitors to "re-browse the same online exhibition" is influenced by the layout and functionality of "easy to operate the function of inquiring information" (B = 0.422). This can be explained that if the "inquiring information" from the art-related online exhibition website is easy to use, it may provide visitors good service quality and experience; thus, these visitors may enjoy the online exhibition and will have a higher chance to revisit the exhibition.

Visitors who joined the nonart-related exhibitions were affected by additional factors compared with those who visited the art-related events. Different types of exhibitions have different focal points. According to Leong and Chennupati (2008), various online exhibitions have different emphases and requirements. For instance, historical-related online exhibitions require abundant information such as the description of events and sources, while scientific-related online exhibitions focus on multimedia technologies such as pictures, videos and sound effects. Because these exhibitions do not just focus on creating the aesthetic environment, "information" and "the way of presenting" should be of more concern because visitors have to understand more about the exhibit's characteristics. The findings from this study match with previous studies, as Interviewee B stated, "the design of the exhibition depends on what exhibits it showed, and for some types of exhibitions like the educational, design is not the most important thing." While Interviewee C commented that, "interactions between the exhibitors and buyers are the most important focus in trade exhibitions."

Visitors who have attended the nonart-related online exhibitions not only concerned the website "aesthetic appeal" dimension, but they also concerned the "layout and functionality" dimension, for instance, "attractive design" (B = 0.743) affects the behavior of "like visiting online exhibition," while "having good experience" is influenced by "creative design"

(B = 0.440) and "images or models are clearly shown" (B = 0.768). "The personalized display" (B = 0.617, 0.585) may affect the willingness of visitors to "re-browse the same exhibition" and "visit other exhibition in the future." "Eye-catching" (B = 0.642) and "simple design" (B = 0.306) will influence behavior of "recommend the exhibition to the others." According to the findings, the dimensions of "aesthetic appeal" and "layout and functionality" showed significant influences on visitor behavior in nonart-related online exhibitions.

4.3 Gender differences on participating in online exhibitions

Visitors from both genders are concerned with "aesthetic appeal" as well as "layout and functionality" dimensions when visiting online exhibitions; however, female and male visitors tend to have somewhat distinctive foci (Table 2).

Female visitors particularly focus on certain elements under "aesthetic appeal" dimension, such as attractiveness (B = 0.736) which affects "like visiting online exhibition," while eye-catching element (B = 0.945) influences if they are "having good experience." Meanwhile, the behavior of "recommend the exhibition to the others" is affected by the elements of entertaining (B = 0.416) and simple design (B = 0.410). The qualitative interviews also showed

Table 2 Regression analysis on gender difference on participating in online exhibitions

Variable	*Female*			*Male*			*Overall*		
	B	*T*	*VIF*	*B*	*T*	*VIF*	*B*	*T*	*VIF*
Like visiting online exhibition									
Constant	0.991	1.834		−1.261	−1.179		0.070	0.133	
Attractive design	0.736	4.570**	1.000	0.754	3.887**	1.005	0.725	6.136**	1.007
Giving relevant necessary information				0.560	2.440*	1.005			
Simple design							0.297	2.470*	1.007
	R^2 = 0.551, F = 20.882**, D-W = 2.021			R^2 = 0.692, F = 11.225**, D-W = 2.120			R^2 = 0.616, F = 23.303**, D-W = 2.054		
Having good experience									
Constant	0.206	0.286		−1.038	−1.044		−0.374	−0.629	
3D images or VR models show clearly	0.603	3.666**	1.404	0.667	3.686**		0.600	4.454**	1.193
Eye-catching design	0.945	3.730**	2.067				0.470	3.192**	1.193
Function of inquiring information are easy to use				0.694	3.419**	1.000			
	R^2 = 0.757, F = 15.544**, D-W = 2.167			R^2 = 0.717, F = 12.640**, D-W = 2.511			R^2 = 0.631, F = 24.744**, D-W = 1.670		
Re-browse the same exhibition									
Constant	0.907	1.560					1.778	1.765	
Time of waiting for reply is acceptable	0.606	3.670**	1.000				0.489	3.142**	1.033
Entertaining design							0.426	2.599*	1.026
	R^2 = 0.442, F = 13.467, D-W = 2.289						R^2 = 0.412, F = 6.530**, D-W = 1.964		
Visit other online exhibition in the future									
Constant	1.700	3.824**		−1.143	−0.812		1.659	2.618*	
Displayed personalized	0.525	4.335**	1.000				0.429	3.455**	1.319
Eye-catching design				1.143	3.469**	1.000	0.505	3.561**	1.156
	R^2 = 0.525, F = 18.789**, D-W = 2.035			R^2 = 0.522, F = 12.034**, D-W = 1.019			R^2 = 0.515, F = 9.893**, D-W = 1.854		
Recommend the online exhibition to others									
Constant	0.619	1.039		1.857	3.236**		0.088	0.142	
Entertaining design	0.416	3.312**	1.015						
Simple design	0.410	2.852*	1.015				0.307	3.220**	1.028
Creative design				0.429	3.023*	1.000			
Eye-catching design							0.379	2.436*	1.395
	R^2 = 0. 575, F = 9.536**, D-W = 1.573			R^2 = 0.454, F = 10.834**, D-W = 1.562			R^2 = 0.521, F = 10.136**, D-W = 1.370		

Notes: Significant at *$p < 0.05$; **$p < 0.01$; D-W = Durbin–Watson

similar findings, as the female interviewee expressed that the aesthetic element is her "most important" concern. Females are known to be more sensitive to colors and more concerned with aesthetic appeal (Wu *et al.*, 2017), which may be able to explain the reasons why "aesthetic appeal" drives female visitor attention and more strongly influences their behavior, for example, whether they like the exhibition or if they will revisit that exhibition. Therefore, those online exhibitions with female visitors as major target should stress the design aspect to enhance visitor subsequent positive behaviors. Besides, females tend to be more interested in aspects such as 3D images or virtual reality (VR) models (B = 0.603), acceptable timing of waiting for reply (B = 0.606) and personalized display (B = 0.525) under "layout and functionality" dimension. Female visitors tend to be concerned if the online exhibition website can provide additional support for them to appreciate the exhibitions. Thus, the dimension of "layout and functionality" may not be the main concern among female visitors but may be as a supplemental element that affects their behavior.

Male visitors have greater focus on elements under "layout and functionality" dimension, and they tend to be concerned more with the richness of the information and functionality of the website (Lin *et al.*, 2019), although the findings show that some "aesthetic appeal" dimension elements may also affect male visitor behavior, such as attractive design (B = 0.754), eye-catching (B = 1.143) and creative (B = 0.429). The elements that concern male visitors under "layout and functionality" dimension include if the online exhibition can provide relevant necessary information (B = 0.560), if the exhibition can clearly present 3D images or VR models (B = 0.667) and whether the online exhibition website is easy to inquire information (B = 0.694). The qualitative interviews also show similar findings, as the male interviewees expressed that they focus more on the functional support and information provided from the online exhibitions. Hence, those online exhibitions which consider male visitors as their major target can focus more on the "layout and functionality" dimension to improve the visitor resultant behaviors.

The overall data among both female and male have similar findings except the simple design (B = 0.297), entertaining design (B = 0.426) and also the eye-catching design (B = 0.379). Design and information presentation are important for both genders.

4.4 Security concerns on participating in online exhibitions

Both female and male visitors showed no security concerns over provision of personal information when visiting online exhibitions, no concern when accept cookies (B = 0.225) and no concern when leaving search history (B = 0.240). This result matches well with the interview responses of "not worrying about leaking of personal data" when visiting online exhibitions. Female visitors particularly have no concern on cookies function (B = 0.406), and male visitors have no concern on leaving browser history (B = 0.351) (Table 3). It may be interpreted that females have less knowledge on technology (Spotts *et al.*, 1997), so they may have no idea or only little understanding of cookies function, so they may not be concerned when the website asks them to accept it. However, for male visitors, they may

Table 3 Regression analysis on security concerns on participating in online exhibitions

	Female			*Male*			*Overall*		
Variable	*B*	*T*	*VIF*	*B*	*T*	*VIF*	*B*	*T*	*VIF*
No concern visiting online exhibition									
Constant	2.259	8.146**		2.494	4.947**		2.107	8.256**	
Cookies function	0.406	5.091**	1.000				0.225	2.379*	
Search history				0.351	2.537*	1.000	0.240	2.442*	
	R^2 = 0.399, F = 25.921**, D-W = 1.916			R^2 = 0.253, F = 6.435*, D-W = 2.130			R^2 = 0.399, F = 19.599**, D-W = 1.910		

Notes: Significant at *$p < 0.05$; **$p < 0.01$; D-W = Durbin–Watson

focus on the information needed from the exhibition; thus, leaving search history does not arouse their concern as long as they get the information that they want.

Apart from that, no relationship was found between the financial security issues from the quantitative study. From qualitative interviews, all interviewees commented that the online exhibitions they visited seldom required payment of an entrance fee, and even if there is payment for the products, the online exhibition website will guide the visitors to the respective exhibitor's website.

5. Conclusions

5.1 Theoretical implications

This paper helps to add knowledge on the e-servicescape concept by filling a research gap by investigating e-servicescape in online exhibitions from a holistic perspective. Previous studies adapted e-servicescape to different service industries such as microblog and online retail stores but did not adapt it to online exhibitions. The objectives of this study are to investigate the applicability of the e-servicescape model in online exhibitions and to explore the environmental dimensions and how these dimensions affect visitors' behaviors. The findings of this study are in line with the original e-servicescape model by Harris and Goode (2010) and affirm that the e-servicescape model is applicable to online exhibitions.

Moreover, previous studies on online exhibitions were largely focused on website design only, but this study expanded the research scope by adapting e-servicescape dimensions to the online exhibition industry. The three environmental dimensions in the e-servicescape model, namely, aesthetic appeal, layout and functionality and security, are all applicable for explaining subsequent visitor behavior in online exhibitions. The study findings help provide research direction for further study on e-servicescape and online exhibitions.

5.2 Practical implications

This research provides exhibition industry practitioners with insights on the application of the e-servicescape model, giving practitioners a better understanding of the concerns from their visitors, in terms of the different types of exhibitions and gender of the visitors. This study found that both "aesthetic design" and "information provision" and "display" have certain influences on visitor behavior; thus, it is recommended that industry practitioners should pay more effort to design, providing clear information, and the display of exhibits in the online exhibition, as these are essential ways to draw more attention from visitors and provide the visitors a better experience.

It is suggested that practitioners should identify the exhibition types and the gender focus of the specific online exhibition, as this study found that different types of online exhibitions and genders have different focus on the corresponding dimensions. For instance, visitors mainly care about artistic enjoyment when visiting art-related online exhibitions, while they will expect to receive more information in nonart-related online exhibitions. Furthermore, gender differences may show their specific focus dimension while visiting the online exhibitions. For example, female visitors are focused on aesthetic design and are not concerned with cookies function. Male visitors focus more on the information provided and have no concern on leaving search history. Therefore, practitioners should stress more the functionality and information in exhibitions such as cars, sports and high technology, where the majority of the visitors are male; and practitioners should stress more the aesthetic appeal dimension in exhibitions such as infant products, food and cosmetics products where most visitors are female. In general, the dimensions of "aesthetic appeal" and "layout and functionality" are important to both genders; meanwhile, the "security" dimension seems to be less concern to visitors, and there is not much concern about privacy information when visiting online exhibitions.

This study also found that the physical exhibitions are still irreplaceable as online exhibition has limitations in enhancing the five senses and facilitating communications, for instance clients cannot feel and touch the fabrics in an online textile trade fair. Furthermore, the objective of providing an exhibition is to provide a communication opportunity between buyer and seller (Leong and Chennupati, 2008), and this may not be able to be fully accomplished in an online exhibition which impose limitations and challenges for the future development of the online exhibition. Thus "online exhibition is not a substitute, but it is complementary with the physical for those who cannot visit due to COVID-19."

5.3 Research limitations and future research

This study has several limitations. First, the sampling frame is not able to generalize for all populations and is limited by small sample size. Also, the online exhibition is still new to most people of different ages, and the definition and chances to visit online exhibitions are still vague. Thus, the collection of data is still challenging. With the booming of online exhibitions, future research should focus more on the adaptation of e-servicescape to other industries, as the comprehensive research on e-servicescape is still lacking.

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