User Acceptance of Online Exhibitions during the COVID-19 Pandemic

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Abstract: The coronavirus disease 2019 (COVID-19) pandemic caused significant disruptions in the art industry, leading to the closure of art galleries and cancellation of exhibitions. To adapt, the industry shifted to online platforms. This study is to explore user acceptance of online exhibitions during the COVID-19 pandemic. Moreover, this study examines the intention to accept online exhibitions among individuals in the U.S. population who used them during the pandemic, using the extended technology acceptance model (E-TAM) as the framework. Extended Technology Acceptance Model is the revised version of the Technology Acceptance Model, which effectively explains new technology acceptance and customer decision-making. The findings highlight the importance of trust, safety, information quality, and ease of use in influencing users' intentions. This research has twofold implications. Academically, it establishes a foundational understanding of factors influencing the acceptance of online exhibitions during pandemics, filling a gap in pandemic-related art market research. Practically, it offers vital guidelines for the art industry adopting online services in the face of digitalization and potential global health risks. By trying to grasp elements that enhance visitor satisfaction and online exhibition usage intent, the art industry can create and sustain successful online services, meeting audience demands and preparing for uncertainties. While limitations exist, such as the research only focusing on the U.S.-centric perspective, addressing these gaps can provide a global view and improve digital art engagement platforms, augmenting the study's insights for art industry adaptation. In conclusion, online exhibitions can complement traditional art experiences, and safety plays a crucial role in user satisfaction and intention to use. This study fills a knowledge gap and provides valuable insights for the art industry's digital transformation.

Keywords: COVID-19, Extended Technology Acceptance Model (ETAM), Intention to Use, Online Exhibitions

1. Introduction

The coronavirus disease (COVID-19) affected the lives of people worldwide. To control the ever-growing transmission of the virus, many countries, including those in Europe and other developed countries, imposed lockdowns and banned cross-border movement. These physical constraints have had a major impact on business as well. In particular, they brought major changes to offline-focused industries, one of which was the art industry, especially in terms of art exhibitions. Nationwide measures for infectious disease control, such as lockdowns, social distancing, and quarantines, restricted visitors

from attending cultural events and even prohibited the holding of exhibitions and performances altogether. The emphasis on social distancing and non-face-to-face contact and concerns about getting infected acted as factors preventing visitors from going to exhibitions. As a repercussion, the culture and art industry was shaken to the foundation. Art galleries that had earned about $250,000 to $500,000 in annual sales before the coronavirus outbreak experienced about a 47% drop in total sales, while nearly 93% of all galleries had to close for an average of ten weeks, or more during the first half of 2020[1]. Exhibitions and conventions also became cancelled one after another, and international art fairs, such as Art Basel[2], Frieze Art Fair, Art Miami, as well as various international art biennales were either cancelled or rescheduled in 2020[3].

Amid this situation, the art industry turned their eyes to online platforms as a survival strategy. International events and exhibitions that were previously held offline began to take their contents to online platforms that were unfettered by the restrictions placed on offline gatherings. This transition to digital transformation has been driving more and more offline-oriented services to take their services online[4]. Art Basel in Hong Kong, the most prominent art fair in Asia, became the first to go completely virtual in the form of online viewing rooms in 2020[5], and the KIAF Seoul, the largest international art fair held in Korea, was also held online in 2020 via online viewing rooms on the KIAF official website and a dedicated mobile application. The renowned London art fair, Frieze London, was also held as a virtual fair in 2020[6].

The increasing embrace of the virtual world by organizers and curators of exhibitions and museums, along with the growing availability of online content, has allowed audiences to enjoy works of art without physically visiting the places where those artworks are held. However, despite this rising trend of digital transformation in the art scene spurred by the COVID-19 pandemic, few studies have been conducted on the intention to use online exhibitions. Considering the technological developments in the art industry, the lack of research in this area points to an ever-widening knowledge gap that requires academic attention. This study aims to mend this gap by examining the intention to accept online exhibitions among people who have used these online services instead of going to offline exhibitions due to the pandemic. This study is expected to provide a theoretical foundation for understanding user acceptance of online exhibitions as well as deliver practical implications related to the art industry's use of online platforms and services.

2. Related Studies

2.1 The Advantages and Disadvantages of Online Exhibitions

As a result of the pandemic, online exhibitions replaced offline exhibitions, which also increased the accessibility to artworks. Art galleries and museums have usually been frequented by culturally educated social classes[7], but online exhibitions made it possible for anyone and everyone to view artworks just by connecting to the Internet. Online exhibitions presented an environment for enjoying culture and art that is less influenced by cultural or social classes, breaking down the barrier for the viewing of art. Moreover, online exhibitions also provide additional functions for improved communication and interaction which are not available at their offline counterparts, such as chatrooms and chatbots[8].

However, despite these advantages, online exhibitions also have limitations. For instance, they are unable to deliver the same feeling of presence as offline exhibitions and require huge costs and relatively new technologies to build[9]. In particular, the inability to reproduce and immerse in the unique atmosphere of the spatial display of artworks at offline exhibitions is a clear disadvantage of virtual exhibitions. Original pieces of art have what is called an "aura," the uniqueness of an artwork characterized by its originality that cannot be reproduced by replicas[10], one-off, and authenticity. The objections to virtual exhibitions are generally raised in relation to their divergence from the traditional

concept of exhibitions based on such materiality and reality[11].

The emergence and spread of online exhibitions have given birth to various discussions, debates, and discourses on the features, functions, and characteristics that exhibitions have or should have. Considering these advantages and disadvantages of online exhibitions, an academic exploration of the audience's acceptance of online exhibitions will reveal various implications for the exhibition industry in the digital era, especially in the aftermath of COVID-19.

2.2 Online Exhibitions in the United States

Diverse types of new online services have appeared in the United States (U.S.) in response to COVID-19, notably in art and culture. The U.S. market is the largest in the world for the art industry, accounting for 44% of global art and antiques sales, which totaled about $64.1 billion in size in 2019[12]. It is estimated that online art sales take up about 9% ($5.9 billion) of global art and antiques sales, and about 57% of the customers who had completed their purchase through online dealers were new customers[12]. The U.S. art industry is also predominant in the online world: two of the world's largest art sales platforms, Artsy and Artnet, are U.S. companies, and the top six online exhibitions chosen by Smithsonian Magazine as "The Top Ten Online Exhibitions of 2020" were held in the U.S.[13].

In the U.S., the development of virtual exhibitions is led by large art galleries and museums. Due to the exceptionally large number of COVID-19 cases that the country faced, most art galleries and museums in the U.S. were mandated to close their doors for longer periods than those in other countries. Being unable to visit art galleries and museums, art lovers turned their interest to virtual art experiences, and art galleries and museums built online services that could substitute on-site visits. Now, the U.S. is pioneering the field by incorporating various technologies to virtual platforms dedicated for the engagement in culture and arts, such as the Museum of Modern Art's Virtual Views. Since there is a greater availability of online exhibitions, the topic of this study, in the U.S., it is possible to surmise that more people in the U.S. visit these virtual exhibitions and have relatively abundant experience of them. Therefore, this study targeted the U.S. population in surveying the user experience of online exhibitions for data collection.

3. Methodology

3.1 Research Design

This study employed bootstrapping as the sampling technique, following a nonparametric approach to assess the significance of different PLS-SEM (Partial least squares path modeling) outcomes[14]. The bootstrapping process involves creating multiple subsamples from the original dataset by random selection with replacement. These subsamples are then utilized to calculate parameter estimates, deriving 95% confidence intervals for significance testing. By employing this technique, we estimated the PLS path model using numerous repeated iterations, resulting in a considerable set of random subsamples, usually around 10,000.

3.1.1 Extended Technology Acceptance Model (E-TAM)

Based on the context illustrated above, this study examined the intention to use online exhibitions using the extended technology acceptance model (E-TAM), which is one of the most suitable models for examining user acceptance of new technologies that takes the structural equation modeling approach to explain the causation mechanism between cause and results. Various studies have used E-TAM models to explain users' adoption intention and acceptance for a wide range of technologies and industries, including the medical industry[15], an English mobile learning application[16], cross-

national online shopping applications[17], and e-learning platforms[18]. Following the examples of previous studies on the user intention to accept new technologies, this study also uses E-TAM to explain the user acceptance of online exhibitions.

3.1.2 Trust

Trust is a factor that is often incorporated in E-TAM as a measure of user satisfaction or attitude, where the higher the level of trust, the higher the positive effect it has on users' attitudes toward and satisfaction with new technologies or innovative services. It is understood that trust arises from users' subjective belief in online service providers' fulfillment of transactional obligations[19]. In terms of marketing, trust plays an important role in creating, developing, and maintaining the exchange relationship between a product or service and its users[20]. Previous studies have confirmed the role of trust in the relationship between users and new technologies as a key external variable, demonstrating the positive impact of trust on customer attitude and intention to purchase[19] and its direct effect on consumer's online purchasing decisions[21].

In the context of this study, trust can be defined as the degree to which visitors of online exhibitions find the information and services provided by the hosts of online exhibitions to be trustworthy, and the following hypotheses were set to examine the relationship between trust and perceived usefulness and between trust and perceived ease of use:

H1-1. Visitors' trust in online exhibition platforms and services positively affects their perceived usefulness of online exhibitions.

H1-2. Visitors' trust in online exhibition platforms and services positively affects their perceived ease of use of online exhibitions.

3.1.3 Safety

Safety has been frequently studied as a measure for users' satisfaction and acceptance in the aviation and transportation industries. Safety was identified as a critical factor for passengers' satisfaction in airlines and thus an important element to highlight for airlines to attract travelers as a marketing strategy[22]. Other studies have confirmed the positive impact of perceived safety on customer satisfaction in airline services[23] and examined the intention to accept self-driving vehicles using safety as the factor representing customer trust[24]. This study examines the intention to use online exhibitions in the context of the pandemic, adopting safety as one of the measures for user acceptance. A core characteristic of online exhibitions is that it enables visitors to view artworks online without having to visit offline locations. Thus, in this study, safety is defined as visitors' overall feeling of safety from choosing online exhibitions over offline exhibitions. Since online exhibitions provide safety from COVID-19-related anxieties, it is expected that the perceived safety of online exhibitions will positively affect the intention to use them. Accordingly, the following hypotheses were set:

H2-1. Visitors' evaluation of the safety of online exhibition platforms and services positively affects their perceived usefulness of online exhibitions.

H2-2. Visitors' evaluation of the safety of online exhibition platforms and services positively affects their perceived ease of use of online exhibitions.

3.1.4 Information Quality

Information quality refers to the existence (or the lack) of diverse and differentiated contents and in-

formation from the user's standpoint[25]. Companies can gain a competitive edge in the market and help consumers to compare products and make better choices by providing differentiated contents and information[26]. A survey on 932 users of online shopping malls found that online and offline features had a positive effect on the intention to accept online shopping platforms[26], while another study used E-TAM to explore the impacts of information quality and perceived value on the user acceptance of hotel front office systems[27]. It has also been reported that the quality of the information provided on mobile hotel reservation services adopted by hotels significantly affected perceived value, which ultimately resulted in positively affecting the intention to accept these services[28].

Accordingly, this study defines information quality as the level of qualitative value perceived by visitors about the information and contents of online exhibitions, and the following hypotheses were set for information quality:

H3-2. Visitors' evaluation of the information quality of online exhibition platforms and services positively affects their perceived usefulness of online exhibitions.

H3-3. Visitors' evaluation of the information quality of online exhibition platforms and services positively affects their perceived ease of use of online exhibitions.

3.1.5 Ubiquity

Ubiquity refers to the accessibility of new technologies, services, or information regardless of place and time[29]. Ubiquity enables users to connect and interact with other users or networks anytime they want, which makes it a positive factor for the user acceptance of new technologies[30]. A study on the intention to use smart clothing systems among patients with cardiovascular disease and older adults using the value-based adoption model (VAM) confirmed that perceived ubiquity positively impacted perceived ease of use as well as influencing perceived usefulness[29]. Perceived ubiquity has also been reported to positively affect the behavioral intention to accept mobile wireless technology[30] and older people's attitude towards mobile healthcare technology[31].

Online platforms are ubiquitous in that they can be accessed anytime and anywhere using various devices, including smartphones. Therefore, this study defines ubiquity as the degree to which visitors feel online exhibitions are accessible regardless of place and time, and the following hypotheses were set for ubiquity:

H4-1. Visitors' evaluation of the ubiquity of online exhibition platforms and services positively affects their perceived usefulness of online exhibitions.

H4-2. Visitors' evaluation of the ubiquity of online exhibition platforms and services positively affects their perceived ease of use of online exhibitions.

3.1.6 Perceived Usefulness

Perceived usefulness is a measure of technology acceptance proposed in the original TAM for explaining behavioral intention and is used for assessing the perceived improvements in work efficiency and performance when using a new technology[32]. In other words, perceived usefulness refers to the degree to which users believe using the new technology will increase their performance efficiency[33]. In this study, perceived usefulness is defined as the improvements in the convenience and efficiency perceived by visitors experiencing online exhibitions and denotes how much visitors feel online exhibitions to be more useful and practical than offline exhibitions. Based on previous studies that have shown the significant effect of perceived usefulness on users' satisfaction[33][34], the following

hypothesis was set for the relationship between perceived usefulness and satisfaction.

H5. Visitors' overall evaluation of the perceived usefulness of online exhibition platforms and services positively affects their satisfaction of online exhibitions.

3.1.7 Perceived Ease of Use

Perceived ease of use refers to the expectation of users that using new technologies and services will not be too difficult[32] and has been associated with the users' perceived usefulness and acceptance intention towards new technologies[35]. In particular, it has been reported that the faster the user learns to use a new technology or new product, the faster it becomes accepted by potential users[36]. This study defines perceived ease of use as the degree to which visitors feel online exhibition services to be simple and easy to use. Based on this definition, perceived ease of use becomes a variable for the level of effort users feel is required when using the online exhibitions.

Perceived ease of use can have a positive effect on perceived usefulness because the easier a new technology is to use, the more useful it is perceived[37]. The positive relationship between the perceived ease of use and the perceived usefulness has been confirmed by a number of studies[37-40], which suggest that a higher level of perceived ease of use led to higher levels of perceived usefulness and acceptance. Other studies have demonstrated the significant positive effect of perceived ease of use on perceived usefulness and satisfaction in terms of the intention to accept mobile shopping applications [34][41]. Based on this review of literature on perceived ease of use, the following hypotheses were set:

H6. Visitors' overall evaluation of perceived ease of use of online exhibition platforms and services positively affects their perceived satisfaction of online exhibitions.

H7. Visitors' overall evaluation of perceived ease of use of online exhibition platforms and services positively affects their perceived usefulness of online exhibitions.

3.1.8 Satisfaction

The level of satisfaction felt when using new technologies and services is a critical factor affecting the user intention to reuse and accept those technologies and services[33]. Satisfaction is a useful variable for predicting users' behavioral intentions because it is relatively easy to measure users' expectations and desires for new technologies[35]. If users' expectations and desires are high, their potential intention to use and reuse might increase as well. Satisfaction is one of the key factors in new technology usage and, when felt, brings loyalty toward the service[42]. Previous studies have demonstrated that satisfaction affects continued use and intention to use[33][35]. In the context of this study, satisfaction is defined as the level of positive or negative assessment made by the user when using online exhibitions, and the following hypothesis was set about the relationship between satisfaction and use intention:

H8. Visitors' overall satisfaction in online exhibition platforms positively affects their intention to use of online exhibitions.

3.1.9 Intention to Use

Intention to use refers to the users' thoughts or intentions about continuously using the services provided by new technologies and products[43] and thus acts as a measure for whether users will accept or continue using new technologies or specific services. The intention to use new technologies has a significant impact on the decision-making process for accepting innovative technologies as well as the

diffusion of new technologies thereafter[44]. It has been reported that the use of new technologies and services is determined by their degree of usefulness and ease of use[32]. Meanwhile, consumer's trust and determination toward products are reflected in their future behavioral intentions[45], and users' high intention to actively accept the new technology positively affects their behavioral intention to continue using it[46]. Accordingly, the consumer's belief in the quality of the service provided by the new technology, including usefulness and ease of use, positively affects their experience of using the new technology and leads to the intention to continue using it. Therefore, in this study, intention to use is defined as the intention to continue using the new technology when a meaningful positive result is obtained under the effect of satisfaction. [Fig. 1] summarizes the research model.
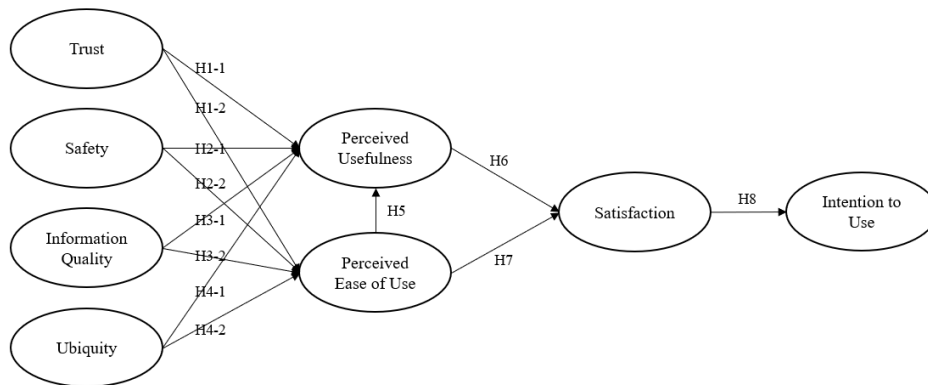
[Fig. 1] Research Model

3.2 Data Collection and Participants

3.2.1 Procedure

The data for this study was collected through a survey conducted through Amazon Mturk on people residing in the U.S. who had experienced online exhibitions at least once. The target population was set as such because there are more numbers of online exhibitions held in the U.S. than in Korea, making U.S. online exhibition users the more suitable sample for exploring the topic on hand. The survey participants were provided with sufficient explanation and examples of online exhibitions to enhance their understanding before they respond to the questionnaire. The participants were asked to respond to each item using a 7-point Likert scale. The questionnaire consisted of 31 items measuring a total of 8 variables. The survey was conducted from April to May 2021. Only those who had previously experienced online exhibitions were allowed to participate in the survey by setting a screening question: "This survey is targeted only to those who have experienced untact (online) exhibitions. Have you ever experienced an untact (online) exhibition?" A total of 385 responses were collected, and after excluding incomplete responses, the final study sample included 297 responses in total.

This study utilized the partial least squares (PLS) approach with smartPLS 3.0 software for structural equation modeling (SEM). SEM has two approaches: covariance-based structural equation modeling (CB-SEM), widely used in social science with software like AMOS, LISREL, and MPlus, and PLS-SEM, which focuses on variance analysis. PLS-SEM is a good alternative to CB-SEM in cases of small sample sizes, limited theory availability, a strong need for predictive accuracy, and uncertainties in model specification[47][48]. Thus, our study adopted the PLS-SEM method using SmartPLS to conduct reliability and validity tests, supporting our hypotheses.

3.2.2 Sample Demographics

The demographic characteristics of the sample were as follows. 61.3% were men, and 38.7% were

women. The majority of the respondents were in their 20s (55.2%) and 30s (31%). 68.7% had two-year college or four-year university degrees, and 24.2% had master's degrees, indicating that the majority had received tertiary education or above. The respondents' average annual incomes varied, with the largest portion of respondents (20.2%) earning between $40,000 and $49,999. The descriptive statistics for sample demographics are summarized in [Table 1].

[Table 1] Demographic Characteristics of Respondents

Characteristics		Frequency	Percentage
Sex	Male	182	38.7
	Female	115	61.3
	Total	297	100
Age	20 - 30 years	164	55.2
	31 - 40 years	92	31
	41 - 50 years	25	8.4
	51 or above	16	5.4
	Total	297	100
Education level (Highest level of education completed)	Some school, no degree	1	0.3
	Middle school graduate	2	0.7
	High school graduate	18	6.1
	Bachelor or professional's degree	204	68.7
	Master's degree	72	24.2
	Total	297	100
Annual income	US$ 19,999 or below	26	8.8
	US$ 20,000 - US$ 29,999	38	12.8
	US$ 30,000 - US$ 39,999	27	9.1
	US$ 40,000 - US$ 49,999	60	20.2
	US$ 50,000 - US$ 59,999	40	13.5
	US$ 60,000 - US$ 69,999	26	8.8
	US$ 70,000 - US$ 79,999	47	15.8
	US$ 80,000 - US$ 89,999	23	7.7
	US$ 90,000 or above	10	3.4
	Total	297	100
Family size	1	9	3
	2	23	7.7
	3	89	30
	4	120	40.4
	5	39	13.1
	6	10	3.4
	Over 6	7	2.4
	Total	297	100
Internet experience	3 years - Less than 6 years	35	21.2
	6 years - Less than 9 years	34	32
	9 years - Less than 12 years	63	23.6
	12 years - Less than 15 years	95	11.8
	15 years - More	70	11.4
	Total	297	100
Frequency of exhibition visits in annual	1 - 5	111	37.4
	6- 10	132	44.4
	11 - 15	38	12.8
	16 - 20	11	3.7
	20 or more	5	1.7
	Total	297	100

3.2.3 Measures

This study adopted measurement items used in previous studies, which were rephrased to match the

context of this study. In this study, a total of eight variables were used, and each variable was measured using at least two items. [Table 2] provides the full list of the measurement items included in the questionnaire and their corresponding variables.

[Table 2] Proposed Measurement Items for Constructs

Variable	Operational definition	Factors	Measurement items	References
Trust	The degree to which visitors (users) of online exhibitions find the information and services provided by the hosts of online exhibitions to be trustworthy	TU1	1. Overall, online exhibitions are credible.	[19], [21]
		TU2	2. The artworks offered by online exhibition sites are reliable.	
		TU3	3. The information about artworks that are given by online exhibitions is trustworthy.	
		TU4	4. I trust service quality of online exhibitions.	
Safety	Visitors' overall feeling of safety from choosing online exhibitions over offline exhibitions	SF1	1. Online exhibitions make me feel safer while viewing artworks.	[22], [23], [24], Self-development
		SF2	2. Viewing online exhibitions makes the process (buying tickets, getting in line) of entering exhibitions safer.	
		SF3	3. I think online exhibitions keep a clean atmosphere.	
		SF4	4. Overall, I feel safer viewing online exhibitions while on an exhibition tour.	
Information quality	Te level of qualitative value perceived by visitors about the information and contents of online exhibitions	INQ1	1. I think online exhibitions provide complete information.	[21], [25], [26], [28]
		INQ2	2. I think online exhibitions provide detailed information.	
		INQ3	3. I think online exhibitions provide timely information.	
		INQ4	4. I think online exhibitions provide reliable information.	
		INQ5	5. I think online exhibitions provide selective information on artworks.	
		INQ6	6. I think online exhibitions provide comparative information between artworks.	
Ubiquity	The degree to which visitors feel online exhibitions are accessible regardless of place and time	UBQ1	1. I can view online exhibitions while heading to another place.	[29], [30], [31]
		UBQ2	2. I can view online exhibitions regardless of where I am.	
		UBQ3	3. I can view online exhibitions regardless of the time.	
Perceived Usefulness	The improvements in the convenience and efficiency perceived by visitors experiencing online exhibitions	PU1	1. I believe online exhibition contents are useful.	[33], [35], [41]
		PU2	2. Viewing online exhibitions will enable me to tour exhibitions more quickly.	
		PU3	3. Viewing online exhibitions will enable me to see artworks faster.	
Perceived Ease of use	The degree to which visitors feel online exhibition services to be simple and easy to use	PEOU1	1. It is easy for me to learn how to view online exhibitions.	[33], [35],[41]
		PEOU2	2. I find online exhibitions easy to use.	
		PEOU3	3. Touring online exhibitions is not complicated; it is easy to understand what is going on.	
Satisfaction	The level of positive or negative assessment made by the user when using online exhibitions	SAT1	1. I am satisfied with using the functions of the online exhibition.	[33], [35],[41]
		SAT2	2. I am satisfied with the information provided by online exhibitions.	
		SAT3	3. I am satisfied with my decision to view artworks through online exhibitions.	
Intention to	The intention to	INT1	1. I intend to use online exhibitions to assist my	[33], [41],

use	use and continue online exhibitions in the future under positive satisfaction		cultural activities.		[43]
		INT2	2. I intend to use the functions of online exhibitions to assist my cultural activities.		
		INT3	3. I would like to see online exhibition functions implemented further in departmental modules.		
		INT4	4. During the next (6) months, I intend to view artworks through online exhibitions.		
		INT5	5. I plan to view online exhibitions in the future.		

4. Results

4.1 Validity and Reliability Tests

The research model was analyzed for indicator reliability, internal consistency, and discriminant validity, and the results are provided in [Table 3] and [Table 4]. Indicator reliability is guaranteed when the factor loading of the measurement items for each variable is 0.6 or above, and internal consistency is considered acceptable when Cronbach's alpha is 0.6 or above, or if all obtained values for composite reliability (CR) are above the minimum requirement of 0.7. Based on these criteria, the research model was confirmed to have good indicator reliability and internal consistency. Also, each latent variables' square root of the AVE value is higher than all of their correlation values with other latent variables, confirming the model's discriminant validity.

[Table 3] Factor Loadings and Internal Consistency

Factor	Loading	C.alpha	Rho_A	C.R
TU1	0.802			
TU2	0.730	0.785	0.786	0.861
TU3	0.787			
TU4	0.799			
SF1	0.834			
SF2	0.695	0.745	0.762	0.841
SF3	0.651			
SF4	0.828			
INQ1	0.712			
INQ2	0.733			
INQ3	0.715	0.818	0.820	0.868
INQ4	0.729			
INQ5	0.729			
INQ6	0.721			
UBQ1	0.798			
UBQ2	0.695	0.625	0.632	0.800
UBQ3	0.771			
PU1	0.850			
PU2	0.801	0.754	0.760	0.859
PU3	0.803			
PEOU1	0.849			
PEOU2	0.822	0.754	0.759	0.859
PEOU3	0.783			
SAT1	0.850			
SAT2	0.755	0.707	0.717	0.836
SAT3	0.754			
INT1	0.793			
INT2	0.734			
INT3	0.765	0.820	0.828	0.874
INT4	0.703			
INT5	0.813			

*Note: TU=Trust, SF=Safety, INQ=Information quality, UBQ =Ubiquity, PU=Perceived Usefulness, PEOU= Perceived Ease of use, SAF=Satisfaction, INT=Intention to use

[Table 4] Validation of Measurement Model—Discriminant Validity

	AVE	SAT	INT	TU	SF	PEOU	PU	INQ	UBQ
SF	0.631	**0.794**							
INT	0.582	0.665	**0.763**						
TU	0.608	0.693	0.620	**0.780**					
SAT	0.572	0.713	0.597	0.739	**0.756**				
PEOU	0.670	0.674	0.613	0.710	0.699	**0.819**			
PU	0.670	0.683	0.643	0.753	0.735	0.696	**0.818**		
INQ	0.523	0.720	0.617	0.762	0.730	0.689	0.736	**0.723**	
UBQ	0.572	0.673	0.613	0.712	0.699	0.704	0.675	0.691	**0.756**

4.2 Hypothesis Testing

The hypotheses were tested through a path analysis using the Smart PLS bootstrap procedure. The bootstrap procedure was repeated 500 times, following the guidelines of previous studies [49][50]. Positive relationships were confirmed between trust and perceived ease of use (t=2.786, p=0.006, path coefficient=0.222), trust and perceived usefulness (t=3.662 , p=0.000, path coefficient=0.261), safety and perceived ease of use (t =2.851, p=0.005, path coefficient=0.213), safety and perceived usefulness (t=3.460, p=0.001, path coefficient=0.228), information quality and perceived ease of use (t=2.250, p=0.025, path coefficient=0.261), information quality and perceived usefulness (t=3.092, p=0.002, path coefficient=0.213), and ubiquity and perceived ease of use (t=4.097, p=0.000, path coefficient=0.275). However, the relationship between ubiquity and usefulness was found to be negative to a statistically insignificant degree (t=1.510, p=0.132, path coefficient=0.079).

Perceived ease of use positively affected perceived usefulness (t=2.458, p=0.014, path coefficient=0.149), while satisfaction was positively impacted by both perceived ease of use (t=6.287, p=0.000, path coefficient=0.383) and perceived usefulness (t=7.891, p=0.000, path coefficient=0.418). Finally, satisfaction had a positive effect on intention to use (t=14.402, p=0.000, path coefficient=0.665). The detailed results of the path analysis are presented in [Fig. 2].
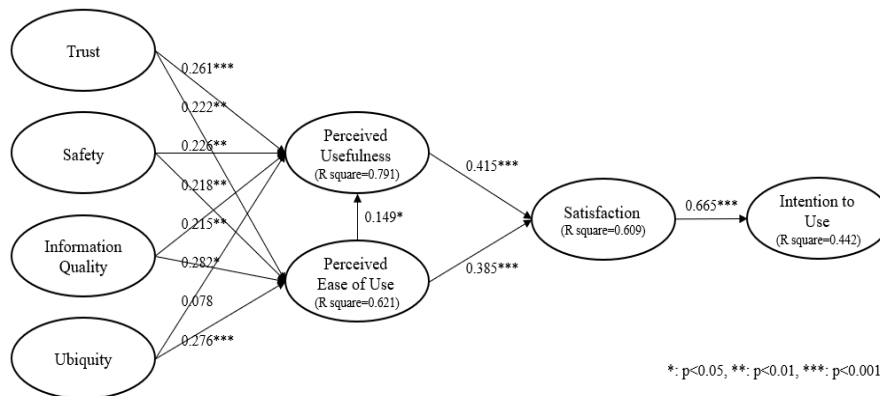
[Fig. 2] The Results from Structural Equation Modeling

5. Discussion

The exhibition-centered art industry, such as galleries and museums, was strongly impacted by the

COVID-19 pandemic in all parts of the world[51], causing industry actors to turn their eyes to online platforms as substitutions of offline exhibitions. This study used E-TAM, a major theoretical model for explaining the intention to use new technologies and services, to explore the factors affecting the intention to use online exhibitions among U.S. residents who have previous experience of them. Notably, this study incorporated safety as one of the constructs to reflect the pandemic situation, which has not been done in previous studies based on E-TAM. The results of the hypothesis testing were as follows.

First, trust had significantly positive effects on perceived usefulness and perceived ease of use, confirming hypotheses H1-1 and H1-2, respectively. The respondents generally trusted the information and services provided by online exhibitions, and the more visitors trusted the information and services provided by the hosts of online exhibitions, the more useful, practical, and easy to use the visitors found online exhibitions for engaging in culture and art. Ultimately, this trust played a positive role in visitors' decision-making on choosing online exhibitions.

Second, safety had significant positive effects on both perceived usefulness and perceived ease of use, thereby confirming hypotheses H2-1 and H2-2, respectively. The feeling of safety has become an important aspect in using services due to COVID-19, but few studies have applied this construct as a variable. This study demonstrated safety as a significant variable for perceived usefulness and perceived ease of use in relation to online exhibitions, which presents valuable implications for the exhibition industry in prolonged public emergency situations. The most notable characteristic of online exhibitions is that they are non-face-to-face: online exhibitions do not require people to gather offline, allowing visitors to keep the social distance necessary to prevent transmission. Our findings suggest that the safety provided by online exhibitions are received positively by their users.

Third, information quality significantly and positively affected perceived usefulness, confirming hypothesis H3-1. Hypothesis H3-2 on the relationship between information quality and perceived ease was also found to be significant. Thus, it could be said that the higher the perceived quality of the information provided by online exhibitions, the higher the usefulness and ease of use visitors perceived in using them. These findings imply that high-quality information provided by cultural services made visitors to feel those services to be more effective and efficient for leading cultural lives. In terms of art exhibitions, high-quality information generally consists of carefully chosen information that helps viewers to understand and compare artworks, and these findings show that visitors find it easy to view artworks and gain the information they want at online exhibitions.

Fourth, ubiquity positively affected perceived ease of use, confirming hypothesis H4-2. Thus, the accessibility of online exhibitions regardless of time and location works as an advantage to enforce the positive perception that online exhibitions are easy to use. However, hypothesis H4-1 on the relationship between ubiquity and perceived usefulness was rejected.

Fifth, perceived ease of use directly and positively impacted perceived usefulness, confirming hypothesis H5. This finding is consistent with those of previous studies[32]. In other words, the more visitors feel that online exhibitions are easy and convenient to use, the more they believe that online exhibitions are beneficial and practical for engaging in cultural activities.

Sixth, hypothesis H6 on the relationship between perceived usefulness and satisfaction and hypothesis H7 on that between perceived ease of use and satisfaction were both confirmed. That is, perceived usefulness and perceived ease of use both positively impacted satisfaction, which is also consistent with previous studies[33][41]. Visitors of online exhibitions felt that online exhibitions are useful, and the degree of usefulness they perceived positively affected the level of satisfaction they feel in using online exhibition services. Moreover, the degree to which they perceived online exhibitions to be easy and convenient to use also positively affected their level of satisfaction.

Finally, satisfaction positively affected the intention to use, confirming hypothesis H8. This relationship between satisfaction and intention to use is in line with the findings of previous studies as well[33][41] and suggests that positive experiences of online exhibitions make it easier to accept them

in the future.

6. Conclusion

This study aimed to explore the factors influencing the acceptance of online exhibitions in the context of the COVID-19 pandemic and provide guidelines for the art industry's transition from face-to-face to non-face-to-face formats. The most important findings can be summarized as follows: first, the feeling of safety positively affected visitor satisfaction and intention to use online exhibitions, highlighting the potential of online platforms to offer a safer alternative during times of global crisis caused by disease. Second, while online exhibitions can enhance the appreciation of artworks, they cannot entirely replace the desire for in-person experiences, as evidenced by art lovers' continued preference for offline exhibitions.

The implications of this research are twofold. From an academic perspective, this study lays a theoretical foundation for understanding the factors influencing the acceptance of online exhibitions during a pandemic, bridging a gap in existing research focused on the impact of the pandemic on the art market. From a practical standpoint, the findings provide valuable guidelines for the art industry as it embraces online services amid ongoing digitalization and potential future risks of global diseases. By understanding the factors that contribute to visitors' satisfaction in and intention to use online exhibitions, the art industry can develop and maintain successful online services to cater to audience demands and safeguard against future uncertainties.

Considering the study's outcomes, the art industry should continue to invest in and expand online exhibition platforms beyond the COVID-19 pandemic. These platforms can serve as a complementary and safer option for art enthusiasts to engage with artworks. However, it is essential to recognize that online exhibitions cannot entirely replace the unique experience of viewing and appreciating artworks in person. Therefore, exhibition organizers and curators should explore ways to integrate offline and online exhibition formats to provide audiences with a more holistic and enriching art experience.

This study has two notable limitations which may be addressed by future research. First, this study focused on U.S.-based users of online exhibitions, limiting the generalizability of the findings to a global context. Future studies should consider a broader international sample to obtain more diverse perspectives. Second, this study primarily explored the characteristics of online exhibition services, neglecting the design aspects, including the user interface components. Incorporating variables related to the design could offer new insights into how user experience affects intention to use online exhibitions and contribute to the continuous evolution and improvement of digital art engagement platforms. Addressing these limitations to complement the valuable insights this study offers to the art industry in navigating the evolving landscape of art engagement will contribute to a more comprehensive understanding of the role online exhibitions play in the art world, both during and beyond times of crisis.

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