

Understanding the Virtual Experiential Value and Its Effect on Travel Intention

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Abstract

This paper explores how tourism virtualization enables consumers to experience memorable feelings in the virtual world and affects the experiential value of virtual tourism and customers' intention to travel in the future. A virtual reality system, The Panoramic Palace Museum, is utilized to conduct a sequence of experiments in tourism experience, and two phases are designed to analyze travel intention. Before using the virtual-reality system, the Theory of Planned Behavior constructs and involvement are employed to explore travel intention. Two identical experiments are conducted on 243 subjects independently, and 211 valid samples are collected. The results show that travel intentions before and after a virtual visit are significantly different and that experiential value significantly increases the intention to travel.

Keywords: Virtual experience, experiential value, service experience, virtualization, travel intention

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1. Introduction

Recently, the Internet has been abundant with virtual-reality-related systems, ranging from online games such as *World of Warcraft* to virtual life sites such as *Second Life*. Virtual reality (VR) commonly refers to using computer technology to create an interactive three-dimensional environment where objects have a sense of spatial presence (Bryson, 2013). With the emergence of the metaverse, the world is recently engaging in VR development. *Second Life*, launched by Linden Research Inc. on June 23, 2003, is aggressively taking on the Facebook Meta (Bobrowsky, 2022). Different businesses have their unique market orientations leading to different functionalities. Virtual experience has become a new lifestyle for customers and emerged as a critical determinant of decision-making and consumption behavior. Pine and Gilmore (1998) were the first to propose the concept of virtual experience in the *Harvard*

Business Review and emphasized the experience economy era in the book “The Experience Economy.” The product is no longer the crucial business focus but the unique service that gives customers memorable experiences. Schmitt (1999) also presented that experiential marketing is one way of getting in touch and interacting with customers. Traditional marketing is always focused on the quality and functionality of products, but experiential marketing is intended to provide unforgettable experiences to customers. In the era of competitive service marketing, corporate advantage comes from the functional attributes of products and consumption value derived from customer experience.

Product quality and characteristics affect consumption intention based on trends in worldwide consumption patterns. Ajzen (1985, 1991) proposed three factors that affect the willingness of consumers: the consumer’s attitude, subjective norm, and perceived behavioral control, all included in the Theory of Planned Behavior (TPB). In the experience economy era, Cheong (1995) stated that a virtual reality (VR) system plays a significant role in helping customers to experience their intended destinations and affects customers’ decision-making regarding travel arrangements. The more interactive, engaging, and attractive the environment a website can offer, the more richness of virtual experience customers can receive (Cano and Prentice, 1998; Gretzel and Yuan, 2000; Bogicevic et al., 2019; Yang et al., 2021; de Amorim et al., 2022).

However, will the experiential value derived from experience service directly affect travel intention? Various virtual experience technologies have been applied to services in different industries, including online games, *Second Life*, and virtual cities. For the scope of this study, we selected the tourism industry as our research domain. Through utilizing the applications of information technology, this research aims to discover which constructs and factors of information technology are the determinants of experiential value. A research model and a two-phased experimental design are proposed to explain and answer these questions.

Besides considering how virtual experience affects travel intention, a virtual reality

system's functions and feature designs are considered. A virtual reality system, The Panoramic Palace Museum (PPM), developed by The Palace Museum of China (<https://en.dpm.org.cn/>), is adopted to explore how virtual experience influences customers' experiential value and travel intention, as well as their involvement with the virtual world. The PPM is a feature of the official website of the Palace Museum in Beijing, China. It uses omnidirectional cameras, also known as 360-degree cameras or VR cameras, to record interactive photography and mix with virtual elements to merge reality and fiction through special effects. The PPM system enables visitors to interactively explore the 600-year-old ancient architectural compound of the Forbidden City, including the labyrinth of its halls, gardens, and courtyards. Visitors can also learn about the story of every exhibit that interests them (China Daily, 2020). Two main reasons are why we selected this virtual system for our research experiment: 1) the system displays one of the famous tourist spots in China that is of interest to our research participants, 2) the system uses the same language, Mandarin, to introduce the virtual scenes which is the mother tongue of our participants.

The remaining sections of the paper are organized as follows. The next section introduces the theoretical background and hypotheses development. We then describe the research model, method, and experimental procedure and outline the data analysis and results. Finally, conclusions and recommendations for future work are also provided.

2. Theories and Hypotheses

First, we briefly describe the TPB and some of its modifications and constructs. In essence, the TPB provides a theoretical foundation for our research model. Furthermore, we introduce to this model one critical construct of Involvement. We then briefly review the other three key constructs: interactivity, vividness, and experiential value. The hypothesis for each construct is posited accordingly.

2.1 Theory of Planned Behavior

The TPB is considered a theoretical framework for developing and assessing the behavioral process of consumption intention in different domains and industries (Ajzen, 1991). TPB has been applied to predict behavioral intention and can be utilized to explain individual behaviors and other behavioral models (Ajzen, 2006; Cano and Prentice, 1998; Steuer, 1992). The theory consists of four key constructs below:

Attitude is a state of mind when a person assesses a product or service and exhibits a general inclination to recognize that product or service. For example, a person likes or dislikes a specific product (Oh, 2003). When a consumer acts in response to a particular behavior, he/she will consider the possible benefits or advantages before making a decision (Gretzel et al., 2000). According to Ajzen's definition, attitude is the positive or negative assessment of actions taken by an individual. If customers feel positive about a product or service, their attitude will be positive and affect their behavioral intention (Lastovicka and Gardner, 1978; Ajzen, 1991). Therefore, Hypothesis 1 is posited below.

H1: Attitude toward visiting a tourist spot (the Palace Museum) directly influences travel intention.

Subjective norm is defined as how people decide their behavioral intention under social pressure or referring to suggestions and ideas from others, such as families, classmates, or business partners (Ajzen, 1991; Olson and Zanna, 1993; Murphy, 2007). Other people's perceived favorableness also influences individuals to take action (De Lucia et al., 2009). Therefore, subjective norm can also be regarded as group norm. When a group of people believes a specific behavior is appropriate, individuals will increase their behavioral intention under group pressure (Gretzel et al., 2000). Cheong (1995) also indicated that when individuals perform behaviors, decision-making is influenced by organizations or others, and the influence

intensity depends on how important the organizations or persons are to the individuals. Therefore, Hypothesis 2 is posited:

H2: Subjective norm toward visiting a tourist spot (the Palace Museum) directly influences travel intention.

Perceived behavioral control (PBC) is a belief in self-control. The increase or decrease in an individual's behavioral intention is based on his/her belief in—and perception of—self-control (Ajzen, 1985); in other words, whether it is easy or difficult for that individual to perform a particular behavior (Ajzen, 1991). In addition, individuals must be capable of controlling objective conditions such as time, money, or resources when willing (Cheong, 1995). Studies have concluded that self-confidence will also positively influence behavior or intention (Taylor and Todd, 1995; Conner and Abraham, 2001; Baker et al., 2007). For example, everyone could have the idea to travel around the world, but when the idea goes into practice, it will be controlled by time, money, self-control, and other factors. The intensity of perceived behavioral control will determine if the action will occur. According to the discourse above, the following hypothesis is posited:

H3: Perceived behavioral control over visiting a tourist spot (the Palace Museum) directly influences travel intention.

2.2 Involvement Theory

When consumers decide on their travel plans, personal background and service features must be considered. For this reason, involvement is added to the TPB in our research model to examine whether it significantly impacts customers' travel intentions.

The involvement theory has been applied to elicit an individual's psychological or

mental state. As customers perceive the importance of services or products that mean something to them, they will pay different degrees of attention according to the influence of other people, the environment, services or products, and so on. Petty and Cacioppo (1986) indicated that involvement is the intensity of decisions to buy or not to buy and the extent of individual involvement when customers select services or products. Product value and brand loyalty are also involvement factors (Kozak, 2001). Moreover, inherent needs, personal values, and perceived favorableness of particular objects also affect the degree of involvement (Zaichkowsky, 1985, 1986). Under the same time constraints and circumstances, the degree of involvement will affect customer decision-making (Huang et al., 2010).

Rothschild (1979) and Zaichkowsky (1986) classified involvement into more detailed categories according to involved objects and targets. This research employed three kinds of involvement: situational involvement (Rothschild, 1979), product involvement, and purchasing involvement (Zaichkowsky, 1986). Firstly, since the experiment time is relatively short, situational involvement is used to explore if a specific tourist spot's involvement positively impacts travel intention under certain conditions or time constraints. Secondly, product involvement represents the degree of attention toward target products or services and personal subjective thoughts. Thirdly, purchasing involvement tends to focus mainly on purchasing activities. Usually, the higher the purchasing involvement, the more consumers will collect product-related information and take longer to consider the action. Thus, the following hypothesis is posited:

H4: The involvement in visiting a tourist spot (the Palace Museum) directly influences travel intention.

2.3 Interactivity and Vividness

Interactivity and **vividness** are two common constructs employed to evaluate the feeling

or perceived sensation experienced in a virtual environment. Steuer (1992) stated that when individuals experience a virtual system, interactivity and vividness are the key factors influencing telepresence. However, each individual may perceive telepresence influence differently. In some cases, the term “presence” appears to explain the same as the term “telepresence,” and they are regarded as the same factor (Baños et al., 2000). Therefore, telepresence is used in this paper to introduce the related literature. Telepresence makes people feel like they are truly inside the virtual environment (Rizzo et al., 1998). Although computer programs generate every move in a virtual environment, users can instantly manipulate and change the virtual scenes by operating user interfaces. This operational control allows users to feel they are a part of the virtual world (Witmer and Singer, 1998; Slater, 1999; Usoh et al., 2000). Therefore, the stronger customers perceive telepresence, the more experiential value they obtain. Interactivity measures the degree of system methods or contents that users can manipulate and is classified into speed, range, and mapping. Speed represents the input ratio that a virtual environment can allow users to input at a particular time, and range is the maximum number of actions accepted by a system at any time. Mapping represents that a virtual system can process maps or graphs smoothly in predictable circumstances. In this vein, Hypothesis 5 is posited:

H5: The interactivity of a virtual reality system (the PPM) positively influences the experiential value of the system.

Vividness represents the richness of perceived sensations derived from the virtual environment and is often measured by the breadth and depth of sensation. The breadth of sensation is the number of senses being stimulated at the same time; that is, the multiple senses are affected simultaneously. The depth of sensation is the clarity and precision attained by the senses of sight, sound, and touch. Inside the virtual environment, users with a first-person

perspective can interact with other participants or virtual characters, not just remain on the sidelines (Benford et al., 1997; Greenberg et al., 1996). Furthermore, the virtual environment provides various ways for non-verbal communication or information exchange; therefore, the perceived sensation will increase accordingly (De Lucia et al., 2009). In addition, a comprehensive system design makes users feel that virtual reality is just like magic being enjoyable and fantastic, and fills them with the desire to keep going (Takatalo et al., 2008). Hence, this study proposes Hypothesis 6:

H6: The vividness of a virtual reality system (the PPM) positively influences the experiential value of the system.

2.4 Experiential Value

Pine and Gilmore (1998) believe that interaction is essential for experience. Interaction with customers during the service experience evokes joy and happiness. During consumption, experiential value is the degree of perceived favorableness toward products or services. Some scholars (e.g., Chang and Wildt, 1994) believe experiential value is crucial to a customer's consumption intention. In this study, we assess experiential value by utilizing four factors proposed by Williams and Soutar (2009): functional value, social value, emotional value, and epistemic value. The functional value measures how specific functionality and attributes of products or services can meet consumers' demands, such as tourism quality, tour prices, travel communication, tour guides, tourist spots and sceneries, and interaction with other tourists. The social value allows consumers to link to other social groups or peers to increase the effectiveness of products and services. In tourism-related literature, social value mainly affects the decision regarding travel product brand and type. The emotional value refers to the consumer's potential feelings or emotional state, such as happiness, fear, excitement, and joy which can be derived from products or services. Finally, the epistemic value can evoke

consumer curiosity, inspire new attempts, and fulfill desired product knowledge. From this discourse, we hypothesize the following:

H7: The experiential value of a virtual reality system (the PPM) positively influences travel intention.

2.5 Travel Intention

Intention represents the probability of a person engaging in a behavior that usually correlates highly with actual behavior (Ajzen, 1991). Behavioral intention can be measured by certain factors, including willingness to do and word-of-mouth recommendations. (Baker and Crompton, 2000; Bigné et al., 2001; Conner and Abraham, 2001; Kozak, 2001). As defined in this study, behavior is related to customers' travel, so it is more appropriate to use the term "travel intention" instead of "behavioral intention." *Travel intention* represents the customers' willingness to visit the intended tourist spot. In the tourism literature, various relationships have been discussed, such as the relationships of satisfaction with value and intention (Gallarza and Saura, 2006; Murphy et al., 2000; Oh, 2003; Petrick, 2002). However, very few empirical studies were found to explore the relationship between experiential value and travel intention (Baker and Crompton, 2000; Fu and Wang, 2021). In particular, there is a dearth of experimental research into how a VR system influences this relationship.

Following the study of Shen, Liang, and Li (2010), two constructs of travel intention are identified to assess subjective willingness to travel respectively before and after the virtual experience. The former focuses on exploring the willingness to go to the target travel spot, as judged by consumers themselves, and that judgment is affected by the consumers' attitude, subjective norm, PBC, and involvement. The latter aims to validate whether the experiential value significantly affects travel intention after the tourist experiences the PPM system. In addition, some prior shopping studies indicated that satisfaction significantly influences future

intentions; therefore, purchase intention varies over time, mainly depending on consumer experience and satisfaction with products or services (Mittal et al., 1999; Williams and Soutar, 2009). In this vein, we predict that travel intention changes after consumer experience a virtual reality system. Furthermore, the two scores of travel intention constructs (before and after visiting the virtual system) are compared to see if any significant difference resulted from the virtual experience. As such, we posit the following two hypotheses:

H8: Travel intention before a virtual visit directly influences that after a virtual visit.

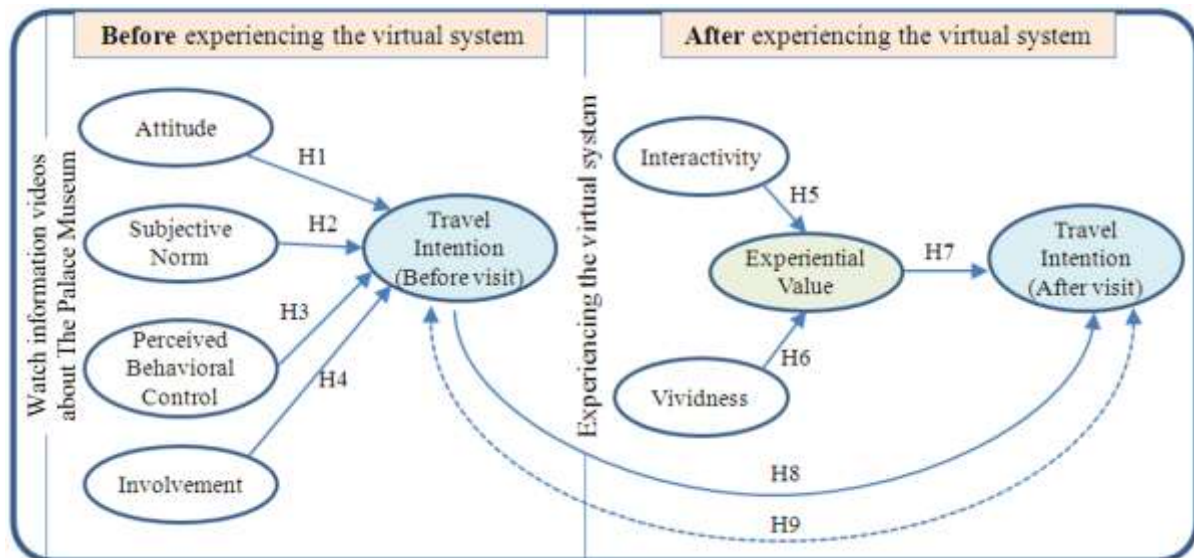
H9: Travel intention changes significantly after the virtual experience.

3. Methodology

3.1 Research Model

Based on the study's purposes and research questions, a research model is proposed, as shown in Figure 1. In this model, two stages of an experiment are conducted. First, before the virtual experience, the subjects must watch two video tours introducing the Palace Museum, each lasting about 10 minutes (see <https://www.youtube.com/watch?v=UO5TdL5Hsbw&t=60s> for tour 1 and <https://www.youtube.com/watch?v=rBlAmDHyzro> for tour 2). Then, they use for 20 minutes a virtual system showing 360-degree interactive photography of the Palace Museum as a virtual tour. The research model contains all the constructs and the corresponding hypotheses before and after the virtual experience. The core structure of the research model is based on TPB. In addition to three TPB constructs (attitude, subjective norm, and PCB), a new construct of involvement is added to predict the travel intention of research subjects in the first stage. In the second stage, two constructs, interactivity and vividness, are employed to predict experiential value after having a virtual experience service. The perceived value of this experience may further affect the travel intention toward the tourist target spots. Table 1 lists the operational definitions and sources of our research constructs. In addition, all constructs have been

reworded appropriately to meet the research themes and purposes.



Note: The dotted two-way arrow indicates that the two constructs of travel intention are subjected to the Student's t-test of paired difference in mean scores.

Figure 1. Research model

Table 1. Definition of the research constructs

Construct	Definition	Sources
Attitude	The customer evaluation or perceived favorableness of products or services	Olson and Zanna (1993)
Subjective norm	The group influence making customers change their behavioral intention	Eagly and Chaiken (1995), Park (2000)
Perceived behavioral control	The perception of self-control (constraints of time or money) regarding buying products or services	Ajzen (1985), Baker et al. (2007), Conner and Abraham (2001)
Involvement	The customer's attention to products or services when they make a decision	Zaichkowsky (1986), Havitz and Mannell (2005), Huang et al. (2010), Lin. (2008)
Travel intention	The customer's intention to perform favorable behaviors	Woodside et al. (1989), Sparks (2007), Han et al. (2010), Tsai. (2010)
Interactivity	The design for telepresence in the virtual system with various display and interaction styles	Sanchez-Vives and Slater (2005)
Vividness	The perceived sensation provided in the virtual world is live and vivid	De Lucia et al. (2009), Takatalo et al. (2008)
Experiential value	The perceived favorableness toward products or services	Ho and Ko (2008), Williams and Soutar (2009), Chen et al. (2008)

3.2 The Panoramic Palace Museum system

This study aims to discover travel intention using a VR system that simulates a realistic tourist spot. Furthermore, the language of the tour guide is also considered since our subjects are all Chinese; thus, Mandarin is the chosen language with which they are most familiar. For the reasons above, this study selects the PPM virtual system as the experimental tool. The PPM has a navigation system in Mandarin developed for a realistic Forbidden City in China. It is a 360-degree virtual system developed by the Palace Museum in Beijing to demonstrate China's most significant historical museum via the Internet. The major features of the PPM are listed in Table 2, while a sample screen of the PPM virtual system is shown in Figure 2.

Table 2. Features of the PPM

System Feature	The PPM
Tour guide	Visitors are self-guided and can turn the screen around at any degree and move on to any direction or labeled attraction.
Tour duration	There is no limit, but a research participant is suggested to complete the tour in 20 minutes, with one minute for each site.

Introduction to the scenic spot	Text-based and more interpretive. Additional graphs are provided for each scene in the introduction window.
Route planning	The tour route has been organized using labeled attractions by the system officials.
Technology	It uses omnidirectional cameras, also known as 360-degree cameras or VR cameras, to record interactive photography.
User interface	It supports interactivity with a mouse, touchpad, or touch pen.
Function icon	Icons to keep in the album, display in full-screen, vote a like, share URL, turn on music, and auto-rotate the scenes.
Mini-map	Yes
Photograph	Yes



Source: China Daily (2020).

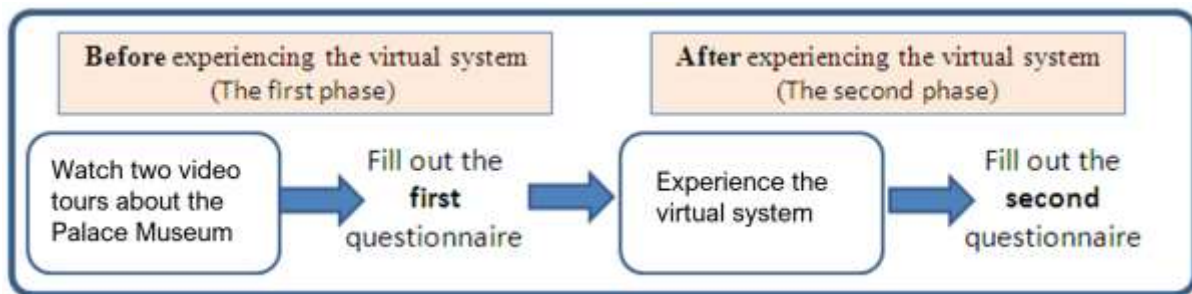
Figure 2. Sample screen of the PPM virtual system

3.3 Experimental Procedures and Participants

This study adapted the experimental process of a previous study (Shen, Liang, and Li, 2010) on the virtualization of the Forbidden City tour in China. To ensure the quality of the experiments, all the independent variables and potential factors of dependent variables were strictly controlled. We used the same experiment condition and equipment (a laptop and network equipment), limited the experiment time, two video tours of the Palace Museum, the PPM virtual system, and two sets of questions before and after the virtual tours. The 20-minute tour time for the PPM virtual system is monitored by an alarm clock, with a reminder bell 5 minutes before the time is up. This reminder lets the informant wrap up the virtual tour within

20 minutes.

We used an electronic board system (Bulletin Board System; BBS; telnet://ptt.cc) to recruit volunteers to participate in the experiments, and all subjects must not have visited the Palace Museum. Our research assistant explained the experimental procedure and necessary precautions when a subject arrived at the experiment room. Then, two tour videos of the Palace Museum were provided for the subject to watch in 25 minutes, allowing 5 minutes to rewind and revisit certain missed scenes. After watching the video tours, the subjects were asked to fill out the first questionnaire, including the first set of questions and additional demographical questions. Before the subject experienced the PPM, the research assistant double-checked the system's stability and initial settings. After the virtual experience, the subject answered the second set of questions. Figure 3 exhibits the experimental procedure.



Source: Adapted from Shen, Liang, and Li (2010)

Figure 3. Experimental procedure

3.4 Questionnaire Design and Subjects

The items in the questionnaire were adapted from several sources. The items for TPB are from Ajzen (2006). Those for involvement are adapted from De Lucia et al. (2009) and Oh (2003). Items for interactivity and vividness are from Eagly and Chaiken (1995) and Baños (2000). Moreover, items for experiential value are from Williams and Soutar (2009). Finally, items for travel intention are from Havitz and Mannell (2005) and Takatalo (2008). These items are listed by each construct in Appendix A. Experience tells us that respondents tend to select

the midpoint (i.e., the neutral option) when they do not want to inform the researcher. Therefore, this study uses a six-point Likert-type scale to require respondents to make a positive or negative decision. The scale of all items of focal constructs thus ranges from “1 = Strongly disagree” to “6 = Strongly agree.”

4. Data Analysis and Results

For the PPM virtual experience experiment, we collected 243 questionnaires, of which 32 were removed due to low internal consistency, leaving 211 valid samples. Among the 211 respondents, 36.62% were male and 63.38% were female. The bulk of the sample’s age ranged from 18 to 30. Also, 88.26% of the subjects had monthly disposable income less than NT\$20,000 (New Taiwan Dollars); the exchange rate is about US\$1 to NT\$30. Furthermore, most (60.56%) respondents had at least a college degree. Regarding average Internet usage frequency, 2.35% used the Internet four days per week, 4.69% five days per week, 6.10% six days per week, and 86.85% every day. Moreover, 91.55% of the subjects had traveled abroad. A summary of the characteristics of the respondents is shown in Table 3.

Table 3. Respondents’ characteristics

		Frequency	Percent
Gender	Male	77	36.62%
	Female	134	63.38%
Age	21 or less	56	26.76%
	21-25	136	64.32%
	26 or more	19	8.92%
Education	High school graduate	3	1.41%
	Bachelor’s degree	125	59.15%
	Advanced degree	83	39.44%
Monthly disposable income	NT\$20,000 or less	186	88.26%
	NT\$20,001~40,000	15	7.04%
	More than NT\$40,000	10	4.69%
Average Internet use (day/per week)	4 days or less	5	2.35%
	5 days	10	4.69%
	6 days	13	6.10%

	Every day	183	86.85%
Frequency of travel abroad	Never	18	8.45%
	6 months or less	6	2.82%
	6 months- 1 year	42	19.72%
	1-5 years	100	47.42%
	5-10 years	20	9.39%
	10 years or more	26	12.21%

4.1 Measurement Model

The confirmatory factor analysis (CFA) is employed as a measurement model to verify whether the constructs are qualified for validity and reliability. SPSS and SmartPLS are utilized to examine the correlation between variables and assess the proposed hypotheses. Through factor analysis (in particular, the principal components analysis), we examined the value of KMO (Kaiser-Meyer-Olkin) and Bartlett's Test of Sphericity to see if the potential factors meet the criteria of factory analysis.

In the **before**-visit model, 15 variables (Q1_1 to Q1_15) were assessed, and the value of the KMO for this set of variables was 0.813, which is higher than the acceptable threshold of 0.80. In addition, all values of factor loadings from these 15 variables are higher than the acceptable threshold of 0.50 recommended by Fornell and Larcker (1981), and the cumulative percentage of variance was 75.156%. The result reveals five extracted factors: attitude, subjective norm, PCB, involvement, and travel intention before the visit. For the details of the questionnaires and factor analysis, please refer to Appendix A and Appendix B, respectively.

In the after-visit model, after assessing 17 variables (Q2_1 to Q2_17), three invalid variables (Q2_4, Q2_12, Q2_13) were eliminated because their factor loadings are high on multiple factors in confirmatory factor analysis. The remaining variables were re-analyzed, and the results showed that the KMO score (0.88) was greater than 0.80, and the factor-loading values of the 14 variables were higher than 0.50. The analysis extracted four valid factors: interactivity, vividness, experiential value, and travel intention after the visit, and the

cumulative percentage of variance was 68.131%.

Concerning the reliability of the constructs, Table 4 reveals that all values of factor loadings, ranging from 0.545 to 0.951, surpass the threshold of 0.50. In addition, the internal consistency reliability (i.e., the composite reliability) values were all higher than 0.80, meeting the threshold of 0.70 (Hair et al., 2011). Furthermore, the average variance extracted (AVE) value for each factor was higher than 0.609, meeting the threshold of 0.5 for convergent validity (Fornell and Larcker, 1981; Hair et al., 2011).

Table 4. Reliability and convergent validity of constructs

Construct	Item	Factor loading	Mean	Standard deviations	Cronbach's α	Composite reliability	Average variance extracted
Attitude	Q1 1	0.866	3.66	0.759	0.790	0.878	0.707
	Q1 2	0.909	3.78	0.795			
	Q1 3	0.738	4.30	0.683			
Subjective norm	Q1 4	0.882	4.19	0.919	0.771	0.865	0.682
	Q1 5	0.848	4.07	0.904			
	Q1 6	0.743	3.95	0.925			
Perceived behavioral control	Q1 7	0.896	3.72	0.876	0.705	0.836	0.640
	Q1 8	0.906	3.69	0.852			
	Q1 9	0.545	2.62	0.917			
Involvement	Q1 10	0.884	3.19	1.021	0.859	0.914	0.780
	Q1 11	0.932	3.14	1.085			
	Q1 12	0.830	3.27	1.177			
Travel intention (before the visit)	Q1 13	0.919	4.15	0.888	0.923	0.951	0.867
	Q1 14	0.951	4.05	0.915			
	Q1 15	0.923	3.80	0.972			
Interactivity	Q2 1	0.861	3.88	0.869	0.613	0.823	0.613
	Q2 2	0.849	4.15	0.841			
	Q2 3	0.615	4.04	0.809			
Vividness	Q2 5	0.842	4.20	0.922	0.609	0.861	0.609
	Q2 6	0.708	4.30	0.826			
	Q2 7	0.749	4.50	0.872			
	Q2 8	0.816	4.06	0.904			
Experiential value	Q2 9	0.825	3.57	0.972	0.618	0.865	0.618
	Q2 10	0.790	3.15	1.014			
	Q2 11	0.825	3.90	0.882			
	Q2 14	0.697	4.02	1.005			
Travel intention (after the visit)	Q2 15	0.915	4.49	0.833	0.848	0.944	0.848
	Q2 16	0.929	4.47	0.833			
	Q2 17	0.919	4.29	0.885			

To assess discriminant validity, one must compare the square root of AVE values with correlation coefficients. As shown in Tables 5 and 6, the values on the diagonal are the squared root of AVE values, and the remaining elements are the correlation coefficients among different

constructs. It can be seen that each squared root of the AVE value is higher than the correlation coefficients for all constructs in the same column and row, indicating the discriminant validity of all constructs in the study.

Table 5. Discriminant validity (before visiting the PPM)

Construct	Involvement	PBC	Subjective norm	Attitude	Travel Intention (before the visit)
Involvement	0.883				
PBC	0.237	0.800			
Subjective norm	0.125	0.389	0.826		
Attitude	0.212	0.390	0.457	0.841	
Travel intention (before the visit)	0.285	0.510	0.515	0.644	0.931

Table 6. Discriminant validity (after visiting the PPM)

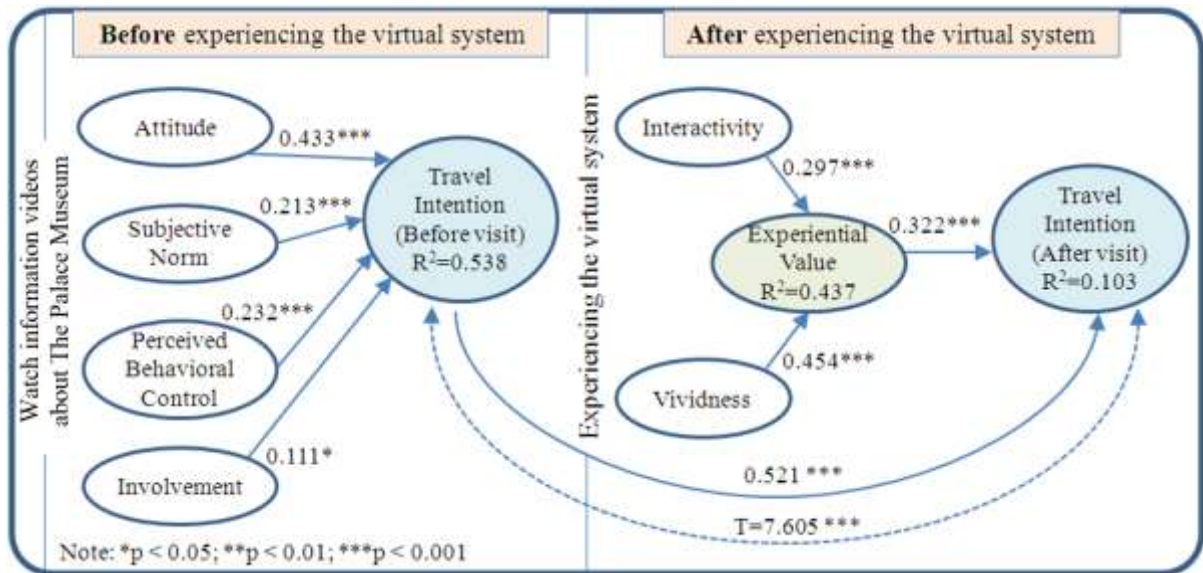
Construct	Interactivity	Vividness	Experiential value	Travel Intention (after the visit)
Interactivity	0.783			
Vividness	0.532	0.780		
Experiential value	0.538	0.612	0.781	
Travel intention (after the visit)	0.306	0.432	0.321	0.921

4.2 Structural Model

Through PLS's computation and bootstrapping method, the path coefficients and t-statistics were derived. The results of the before-visit model support hypotheses related to TPB, i.e., H1, H2, and H3 (see Figures 1 and 4). Specifically, the attitude had a significant influence on travel intention ($\beta=0.433$, $p<0.001$), subjective norm had a significant effect on travel intention ($\beta=0.213$, $p<0.001$), and the PBC had a significant effect on travel intention ($\beta=0.232$, $p<0.001$). In addition, hypothesis 4 was also supported; that is, involvement directly impacted the travel intention of visiting the Palace Museum ($\beta=0.111$, $p<0.05$).

The results of the after-visit model showed that interactivity had a significant effect on experiential value ($\beta=0.297$, $p<0.001$), and vividness significantly impacted experiential value ($\beta=0.454$, $p<0.001$), supporting Hypotheses 5 and 6, respectively. Furthermore, as expected,

the experiential value had a significant and positive influence on travel intention ($\beta=0.322$, $p<0.001$), supporting Hypothesis 7, and travel intention before the visit has a direct impact on travel intention after the visit ($\beta=0.521$, $p<0.001$), supporting Hypothesis 8.



Note: The dotted two-way arrows indicate that the two constructs of travel intention are subjected to the Student's t-test of paired difference in mean scores.

Figure 4. Research model with test results

Finally, the paired Student's t-test was conducted to compare before-and-after travel intentions and assess the proposed Hypothesis 9. The mean intention before the visit was 3.998 with a standard deviation of 0.861; the mean intention after the visit was 4.419 with a standard deviation of 0.783. Indeed, the results showed that the after-visit travel intention is higher than the before-visit intention. The t-statistic was 7.605 and significant at $p<0.001$, as shown in Table 7. Therefore, the travel intention changed positively and significantly after experiencing the PPM, supporting Hypotheses 9.

Table 7. Paired t-test

Travel intention (before the visit)		Travel intention (after the visit)		Paired difference*			t	df	Sig. (2-tailed)
Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Std. Error Mean			

3.998	0.861	4.419	0.783	0.421	0.808	0.055	7.605	212	0.000
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* The difference between before-visit and after-visit travel intentions = (travel intention after the visit – travel intention before the visit)

5. Conclusions and Recommendations

This study utilized experiment and survey methods to collect data and analyze them with SPSS and SmartPLS to examine the constructs and their associations in the research model. The main objective of this study was to explore whether or not a virtual reality system could affect consumers' decision-making on travel spots. The study used confirmatory factor analysis to examine the underlying dimensions for the key constructs, including attitude, subjective norm, perceived behavioral control, involvement, interactivity, vividness, experiential value, and travel intention. In addition to the original constructs of the well-known theory (TPB), this study further confirms that the newly added construct from involvement theory can be considered as an influencer affecting an individual's travel intention. Furthermore, by experiencing the interactivity and vividness of a VR system, users can derive experiential value. The results further confirm that experiential value positively impacts users' behavioral intention toward visiting the tourist spot. A summary of the hypothesis test results is shown in Table 8.

Table 8. Results of hypothesis tests

Research Hypothesis	β value	Decision	T value	P (2-tailed)
H1. <i>Attitude</i> toward visiting a tourist spot \rightarrow <i>Travel intention</i> before the visit	0.433	Supported	6.336	p<0.001
H2. <i>Subjective norm</i> toward visiting a tourist spot \rightarrow <i>Travel intention</i> before the visit	0.213	Supported	3.636	p<0.001
H3. The <i>Personal Behavioral Control</i> over visiting the tourist spot \rightarrow <i>Travel intention</i> before the visit	0.232	Supported	3.589	p<0.001
H4. <i>Involvement</i> toward visiting a tourist spot \rightarrow <i>Travel intention</i> before the visit	0.111	Supported	2.323	p<0.05
H5. <i>Interactivity</i> of the virtual system \rightarrow <i>Travel intention</i> after the visit	0.297	Supported	3.746	p<0.001
H6. <i>Vividness</i> of the virtual system \rightarrow <i>Travel intention</i> after the visit	0.454	Supported	4.939	p<0.001
H7. <i>Experiential value</i> of the virtual system \rightarrow <i>Travel intention</i> after the visit	0.322	Supported	4.960	p<0.001
H8. <i>Travel intention</i> before the visit \rightarrow <i>Travel intention</i> after the visit	0.521	Supported	8.336	p<0.001

H9. <i>Travel intention</i> increases significantly after the virtual experience	N/A	Supported	7.605	p<0.001
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In several short interviews after the experiments, several subjects stated that their curiosity about the virtual city was satisfied. We found that people with less contact with similar experiential services (e.g., ordinary virtual games) will be significantly influenced after the virtual experience. However, if a virtual tour takes longer than 20 minutes (e.g., virtual scenes move slowly, the text guide involves too many details, or descriptive historical introductions are too long), participants may have less patience with the tour.

Finally, the results of this study offer two recommendations. First, tourism service providers could promote their tour packages by using tour videos or VR systems to visit and experience the destinations virtually. Customers who experience the tours through these media could increase their intentions to purchase the tour packages. Our study shows that after watching the two video tours, the travel intention scales scored between 3.80 to 4.15, all above the midpoint of 3.50 and showing a slight intention to visit. However, the PPM virtual system further enhanced these intention scales, reaching 4.29 to 4.4.9 and supporting the recommendation. Second, attitude toward a destination and vividness of the PPM system are the two determinants of travel intention. Their path coefficients are the highest before and after virtual visits. While attitude reflects a customer’s willingness (thus intention) to travel to the destination, vividness represents the joyous sensation of the tour destination a customer perceives in memory. Tourism service providers should strive to improve the values of these two constructs, leading to higher travel intention and more sales of tour packages.

References

- Ajzen, I. (1985) ‘From intentions to actions: a theory of planned behavior’, in Kuhl, J. and Beckmann, J. (Eds.). *Action-control: From Cognition to Behavior*. Springer, Heidelberg, Germany, pp. 11-39
- Ajzen, I. (1991). ‘The theory of planned behavior’, *Organizational Behavior and Human Decision Processes*, Vol. 50, No2, pp. 179-211.

- Ajzen, I. (2006). 'Constructing a TPB questionnaire: conceptual and methodological considerations', available online at: <http://people.umass.edu/aizen/tpb.html> (accessed October 1 2010).
- Baker, D. A. and Crompton, J. L. (2000) 'Quality, satisfaction and behavioral intentions', *Annals of Tourism Research*, Vol. 27, No. 3, pp. 785-804.
- Baker, E., Al-Gahtani, S., and Hubona, G. (2007) 'The effects of gender and age on new technology implementation in a developing country: testing the theory of planned behavior (TPB)', *Information Technology and People*, Vol. 20, No. 4, pp. 352-375.
- Baños, R. M., Botella, C., García-Palacios, A., Villa, H., Perpiñá, C., and Alcañiz, M. (2000) 'Presence and reality judgment in virtual environments: a unitary construct?', *CyberPsychology and Behavior*, Vol. 3, No. 3, pp. 327-335.
- Benford, S., Bowers, J., Fahlén, L. E., Greenhalgh, C., and Snowdon, D. (1997) 'Embodiments, avatars, clones and agents for multi-user, multi-sensory virtual worlds', *Multimedia Systems*, Vol. 5, No. 2, pp. 93-104.
- Bigné, J. E., Sánchez, M. I., and Sánchez, J. (2001) 'Tourism image, evaluation variables and after purchase behavior: inter-relationship', *Tourism Management*, Vol. 22, No. 6, pp. 607-616.
- Bobrowsky, M. (2022) 'Second Life founder returns to take on the Metaverse', Tech Report, *The Wall Street Journal*, January 14, 2022, available online at: <https://www.wsj.com/articles/second-life-founder-returns-to-take-on-the-metaverse-11642080602> (accessed May 3 2023).
- Bogicevic, V., Seo, S., Kandampully, J. A., Liu, S. Q., and Rudd, N. A. (2019) 'Virtual reality presence as a preamble of tourism experience: the role of mental imagery', *Tourism Management*, Vol. 74, pp. 55-64.
- Bryson, S. (2013) 'Virtual reality: a definition history - a personal essay', *arXiv preprint arXiv:1312.4322*. available online at: <https://doi.org/10.48550/arXiv.1312.4322> (accessed May 3 2023).
- Cano, V. and Prentice, R. (1998) 'Opportunities for endearment to place through electronic visiting: WWW homepages and the tourism promotion of Scotland', *Tourism Management*, Vol. 19, No. 1, pp. 67-73.
- Chang, T. Z. and Wildt, A. R. (1994) 'Price, product information, and purchase intention: an empirical study', *Journal of the Academy of Marketing Science*, Vol. 22, No. 1, pp. 16-27.
- Chen, Y. C., Shang, R. A., and Lin, A. K. (2008) 'The intention to download music files in a p2p environment: consumption value, fashion, and ethical decision perspectives', *Electronic Commerce Research and Applications*, Vol. 7, No. 4, pp. 411-422.
- Cheong, R. (1995) 'The virtual threat to travel and tourism', *Tourism Management*, Vol. 16, No. 6, pp. 417-422.
- China Daily (2020) 'Virtual tour of the Palace Museum', available online at: <https://www.chinadaily.com.cn/a/202003/13/WS5e6afceda31012821727ee17.html> (accessed May 3 2023).

- Conner, M. and Abraham, C. (2001) 'Conscientiousness and the Theory of Planned Behavior: toward a more complete model of the antecedents of intentions and behavior', *Personality and Social Psychology Bulletin*, Vol. 27, No. 11, pp. 1547-1561.
- de Amorim, I. P., Guerreiro, J., Eloy, S., and Loureiro, S. M. C. (2022) 'How augmented reality media richness influences consumer behaviour', *International Journal of Consumer Studies*, Vol. 46, No. 6, pp. 2351-2366.
- De Lucia, A., Francese, R., Passero, I., and Tortora, G. (2009) 'Development and evaluation of a virtual campus on Second Life: the case of Second DMI', *Computers & Education*, Vol. 52, No. 1, pp. 220-233.
- Eagly, A. H. and Chaiken, S. (1995) 'The psychology of attitudes', *Psychology & Marketing*, Vol. 12, No. 5, pp. 459-466.
- Fornell, C. R. and Larcker, D. F. (1981) 'Structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, Vol. 18, No. 1, pp. 39-50.
- Gallarza, M. G. and Saura, I. G. (2006) 'Value dimensions, perceived value, satisfaction and loyalty: an investigation of university students' travel behavior', *Tourism Management*, Vol. 27, No. 3, pp. 437-452.
- Shen, C.L., Liang, Y.C., and Li, E.Y. (2010). 'The impact of experience in service virtualization on travel intention - The case of Forbidden City tour', *Proceedings of the 10th International Conference on Electronic Business*, Shanghai, China, pp. 101-110.
- Greenberg, S., Gutwin, C., and Cockburn, A. (1996) 'Awareness through fisheye views in relaxed-WYSIWIS groupware', *Proceedings of the Conference on Graphics Interface '96*, Toronto, Ontario, Canada, pp. 28-38.
- Gretzel, U., Yuan, Y. L., and Fesenmaier, D. R. (2000) 'Preparing for the new economy: advertising strategies and change in destination marketing organizations', *Journal of Travel Research*, Vol. 39, No. 2, pp. 146-156.
- Hair, J. F., Ringle, C. M., and Sarstedt, M. (2011) 'PLS-SEM: indeed a silver bullet', *Journal of Marketing Theory and Practice*, Vol. 19, No. 2, pp. 139-151.
- Han, H., Hsu, J., and Sheu, C. (2010) 'Application of the Theory of Planned Behavior to green hotel choice: testing the effect of environmental friendly activities', *Tourism Management*, Vol. 31, No. 3, pp. 325-334.
- Havitz, M. E. and Mannell, R. C. (2005) 'Enduring involvement, situational involvement, and flow in leisure and non-leisure activities', *Journal of Leisure Research*, Vol. 37, No. 2, pp. 152-177.
- Ho, S. H. and Ko, Y. Y. (2008) 'Effects of self-service technology on customer value and customer readiness', *Internet Research*, Vol. 18, No. 4, pp. 427-446.
- Huang, C. Y., Chou, C. J., and Lin, P. C. (2010) 'Involvement theory in constructing bloggers' intention to purchase travel products', *Tourism Management*, Vol. 31, No. 4, pp. 513-526.
- Huang, Y. C., Backman, S. J., and Backman, K. F. (2010) 'The impacts of virtual experiences on people's travel intentions', *Information and Communication Technologies in Tourism*, Vol. 15, pp. 555-566.

- Kozak, M. (2001) 'Repeaters behavior at two distinct destinations', *Annals of Tourism Research*, Vol. 28, No. 3, pp. 784-807.
- Lastovicka, J. L. and Gardner, D. M. (1978) 'Low involvement versus high involvement cognitive structures', *Advances in Consumer Research*, Vol. 5, 87-92.
- Lin, W. B. (2008) 'Investigation on the model of consumers' perceived risk - Integrated viewpoint', *Expert Systems with Applications*, Vol. 34, No. 2, pp. 977-988.
- Mittal, V., Kumar, P. and Tsiros, M. (1999) 'Attribute-level performance, satisfaction, and behavioral intentions over time: a consumption-system approach', *Journal of Marketing*, Vol. 63, No. 2, pp. 88-101.
- Murphy, L., Mascardo, G., and Benckendorff, P. (2007) 'Exploring word-of-mouth influences on travel decisions: friends and relatives vs. other travellers', *International Journal of Consumer Studies*, Vol. 31, No. 5, pp. 517-527.
- Murphy, P., Pritchard, M. P., and Smith, B. (2000) 'The destination product and its impact on traveler perceptions', *Tourism Management*, Vol. 21, No. 1, pp. 43-52.
- Oh, H. (2003) 'Price fairness and its asymmetric effects on overall price, quality, and value judgements: the case of an upscale hotel', *Tourism Management*, Vol. 24, No. 4, pp. 387-399.
- Olson, J. M. and Zanna, M. P. (1993) 'Attitudes and attitude change', *Annual Review of Psychology*, Vol. 44, pp. 117-154.
- Park, H.S. (2000) 'Relationships among attitudes and subjective norms: testing the theory of reasoned actions across cultures', *Communication Studies*, Vol. 51, No. 2, pp. 162-175.
- Petrick, J. F. (2002) 'Development of a multi-dimensional scale for measuring the perceived value of a service', *Journal of Leisure Research*, Vol. 34, No. 2, pp. 119-134.
- Petty, R. E. and Cacioppo, J. T. (1986) *Communication and Persuasion: Central and Peripheral Routes to Attitude Change*. Springer-Verlag, New York Inc,
- Pine, B. J. and Gilmore, J. H. (1998) 'Welcome to the experience economy', *Harvard Business Review*, Vol. 76, No. 4, pp. 97-105.
- Rizzo, A. A., Wiederhold, M., and Buckwalter, J. G. (1998) 'Basic issues in the use of virtual environments for mental health applications', in Giva, G., Wiederhold, B. K. and Molinari, E. (Eds.), *Virtual Environments in Clinical Psychology and Neuroscience: Methods and Techniques in Advanced Patient-Therapist Interaction*, IOS Press, Amsterdam, Netherlands, pp. 21-42.
- Rothschild, M. L. (1979) 'Marketing communications in nonbusiness situations or why it's so hard to sell brotherhood-like soap', *Journal of Marketing*, Vol. 43, No. 2, pp. 11-20.
- Sanchez-Vives, M. V. and Slater, M. (2005) 'From presence to consciousness through virtual reality', *Nature Reviews Neuroscience*, Vol. 6, No. 4, pp. 332-339.
- Schmitt, B. H. (1999) *Experiential Marketing: How to Get Customers to Sense, Feel, Think, Act and Relate to Your Company and Brands*. Free Press, New York, NY.

- Shen, C.L., Liang, Y.C., and Li, E.Y. (2010). 'The impact of experience in service virtualization on travel intention - The case of Forbidden City tour', *Proceedings of the 10th International Conference on Electronic Business*, Shanghai, China, pp. 101-110.
- Slater, M. (1999) 'Measuring presence: a response to the Witmer and Singer presence questionnaire', *Presence: Teleoperators and Virtual Environments*, Vol. 8, No. 5, pp. 560-565
- Sparks, B. (2007) 'Planning a wine tourism vacation? factors that help to predict tourist behavioral intentions', *Tourism Management*, Vol. 28, No. 5, pp. 1180-1192.
- Steuer, J. (1992) 'Defining virtual reality: dimensions determining telepresence', *Journal of Communication*, Vol. 42, No. 4, pp. 73-93.
- Takatalo, J., Nyman, G., and Laaksonen, L. (2008) 'Components of human experience in virtual environments', *Computers in Human Behavior*, Vol. 24, No. 1, pp. 1-15.
- Taylor, S. and Todd, P. (1995) 'Assessing IT usage: the role of prior experience', *MIS Quarterly*, Vol. 19, No. 4, pp. 561-570.
- Tsai, C. Y. (2010) 'Applying the theory of planned behavior to explore the independent travelers' behavior', *African Journal of Business Management*, Vol. 4, No. 2, pp. 221-234.
- Usoh, M., Catena, E., Arman, S., and Slater, M. (2000) 'Using presence questionnaires in reality', *Presence: Teleoperators and Virtual Environments*, Vol. 9, No. 5, pp. 497-503
- Williams, P., and Soutar, G. N. (2009) 'Value, satisfaction and behavioral intentions in an adventure tourism context', *Annals of Tourism Research*, Vol. 36, No. 3, pp. 413-438.
- Witmer, B. G. and Singer, M. J. (1998) 'Measuring presence in virtual environments: a presence questionnaire', *Presence*, Vol. 7, No. 3, pp. 225-240.
- Woodside, A. G., Frey L. L., and Daly, R. T. (1989) 'Linking service quality, customer satisfaction, and behavioral intention: from general to applied frameworks of the service encounter', *Journal of Health Care Marketing*, Vol. 9, No. 4, pp. 5-17.
- Yung, R., Khoo-Lattimore, C., Prayag, G., and Surovaya, E. (2021) 'Around the world in less than a day: virtual reality, destination image and perceived destination choice risk in family tourism', *Tourism Recreation Research*, Vol. 46, No. 1, pp. 3-18.
- Zaichkowsky, J. L. (1985) 'Measuring the involvement construct', *Journal of Consumer Research*, Vol. 12, No. 3, pp. 341-352.
- Zaichkowsky, J. L. (1986) 'Conceptualizing involvement', *Journal of Advertising*, Vol. 15, No. 2, pp. 4-34.

Appendix A. Questionnaires used to measure the constructs

Construct	ID	Question	Source
Attitude	Q1_1	After studying the tour guide of the Palace Museum, I desire to travel there.	Ajzen (1985)
	Q1_2	After studying the tour guide of the Palace Museum, I like to travel there.	
	Q1_3	After studying the tour guide of the Palace Museum, I feel positive about it.	
Subjective norm	Q1_4	If the Palace Museum is on the hot list, I also want to go.	Ajzen (1985)
	Q1_5	I would like to visit the Palace Museum, recommended by friends/family.	
	Q1_6	Tourist information providers (e.g., Internet, television, magazines, agents, etc.) can affect me to visit the Palace Museum.	
Perceived behavioral control	Q1_7	Next time I travel to China, I have enough money to visit the Palace Museum.	Ajzen (1985)
	Q1_8	Next time I travel to China, I have enough time to visit the Palace Museum.	
	Q1_9	Next time I travel to China, no reason can stop me from visiting the Palace Museum.	
Involvement	Q1_10	I spend plenty of time collecting and studying information about the Palace Museum.	De Lucia et al. (2009); Oh (2003)
	Q1_11	I review a lot of tour reviews/comments regarding the Palace Museum.	
	Q1_12	I spend time comparing the tour prices of the Palace Museum.	
Travel intention (before the virtual tour)	Q1_13	I would like to go to the Palace Museum.	Ajzen (1985); Havitz and Mannell (2005); Takatalo et al. (2008)
	Q1_14	I would like to spend time on visiting the Palace Museum.	
	Q1_15	I would like to spend money on visiting the Palace Museum.	
Interactivity	Q2_1	The operations provided by the virtual reality system are easy for me to control and use.	Eagly and Chaiken (1995); Baños (2000)
	Q2_2	The virtual objects are vivid to me.	
	Q2_3	The system provides quite adequate information.	
	Q2_4*	My interactions with the virtual world seem natural to me, like those in the real world.	
Vividness	Q2_5	I feel like being in the real world while touring the virtual reality system.	Eagly and Chaiken (1995); Baños (2000)
	Q2_6	I feel like being a tourist in the real world while taking the tour.	
	Q2_7	The virtual tour of the Palace Museum is impressive.	
	Q2_8	The characters or objects in the system bring the virtual tour alive.	
Experiential value	Q2_9	The quality of the virtual tour is as good as that of a real tour.	Williams and Soutar (2009) (Refer to Novelty Value to Intention)
	Q2_10	After the virtual tour, I felt I had fulfilled my wish to travel.	
	Q2_11	When I take the virtual tour of the Palace Museum, I really enjoy it.	
	Q2_12*	When I take the virtual tour of the Palace Museum, I feel joyful.	
	Q2_13*	After the virtual tour, it offered me knowledge about the Palace Museum.	
Travel intention (after the virtual tour)	Q2_14	After the virtual tour, my curiosity was satisfied.	Ajzen (1985); Havitz and Mannell (2005); Takatalo et al. (2008)
	Q2_15	I am willing to visit the Palace Museum.	
	Q2_16	I am willing to spend time visiting the Palace Museum.	
	Q2_17	I am willing to spend money on visiting the Palace Museum.	

* The item is removed because it is cross-loaded highly on multiple factors in the confirmatory factor analysis.

Appendix B. Factor analysis

1. Factor analysis (Before the visit)

	Involvement	Attitude	Travel intention (Before the visit)	Subjective norm	Perceived behavioral control
q1_11	.915	.064	.094	.047	.091
q1_12	.857	.007	.035	.134	.035
q1_10	.841	.123	.121	-.084	.115
q1_2	.108	.813	.296	.105	.122
q1_1	.050	.753	.262	.184	.193
q1_3	.053	.620	.278	.241	-.006
q1_14	.157	.383	.729	.202	.274
q1_15	.132	.335	.708	.196	.352
q1_13	.148	.432	.687	.262	.228
q1_5	-.064	.091	.223	.827	.091
q1_6	.100	.155	-.013	.801	.101
q1_4	.070	.213	.279	.712	.228
q1_8	.087	.054	.261	.127	.839
q1_7	.073	.025	.324	.141	.808
q1_9	.139	.453	-.392	.134	.600
Extraction method: Principal component analysis Rotation method: Equamax with Kaiser normalization A rotation converged in 9 iterations					
Total variance explained – Initial Eigenvalues					
Eigenvalue	5.734	2.118	1.258	1.253	0.910
% of variance	38.224	14.120	8.389	8.356	6.066
Cumulative %	38.224	52.344	60.734	69.090	75.156

2. Factor analysis (After the visit)

	Travel intention (After the visit)	Experiential value	Vividness	Interactivity
q2_17	.905	.080	.096	.161
q2_16	.896	.103	.165	.122
q2_15	.870	.127	.190	.079
q2_10	-.025	.839	.128	.158
q2_9	.138	.765	.260	.166
q2_11	.140	.655	.302	.295

q2_14	.204	.603	.188	.145
q2_6	.078	.253	.771	-.091
q2_5	.192	.193	.715	.359
q2_8	.131	.318	.646	.280
q2_7	.334	.104	.629	.281
q2_1	.074	.271	.163	.756
q2_3	.216	.047	.013	.707
q2_2	.035	.250	.296	.706
Extraction method: Principal component analysis Rotation method: Equamax with Kaiser normalization A rotation converged in 6 iterations				
Total variance explained – Initial Eigenvalues				
Eigenvalue	5.542	1.942	1.101	0.953
% of variance	39.586	13.870	7.866	6.809
Cumulative %	39.586	53.456	61.323	68.131