

INTENTION TO USE VIRTUAL REALITY IN SARAWAK TOURISM DESTINATIONS: A TEST OF STIMULUS-ORGANISM-RESPONSE (S-O-R) MODEL

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Abstract: The industry of tourism in Malaysia is highly recognized for its contribution to the national economy and employment opportunities. However, following the strike of global epidemic due to COVID-19, the number of visitations by tourists has plunged and Malaysia is currently in its stage of revitalizing the industry post-COVID-19. To rejuvenate the tourism industry of Sarawak, Malaysia, the understanding of motivators to boost favourable tourists' behaviours is crucial, given the ever-changing situation in the tourism market. This study explored the relationship between dimensions of Stimulus-Organism-Response (S-O-R) model, particularly in tourism destinations of Sarawak with the adoption of Virtual Reality (VR) technology. The survey was participated by 250 tourists and the proposed model was evaluated using WarpPLS 8.0. The statistical findings revealed the significant positive relationships between all tested constructs (i.e., media richness, presence, utilitarian and hedonic value, behavioural and visit intention). The implications of these findings are further discussed.

Key words: virtual reality, behavioral intention, tourists, S-O-R Model, Malaysia

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INTRODUCTION

Tourism can be defined as a series of activities chosen at random and performed outside of one's immediate surroundings (Camilleri, 2018) and is regarded as one of the most significant economic drivers of growth and development as well as a source of revenue and cultural wealth for a nation is the tourism industry (Loss, 2019). The United Nations World Tourism Organization (UNWTO) has estimated that there were only 25 million tourists worldwide in 1950 and the number of overseas arrivals of the tourists has risen to 1.4 billion every year after 68 years. Apart from that, according to statistics by Malaysia Tourism Promotion Board (MTPB), a total of 26.1 million tourist have arrived in Malaysia in year of 2019 prior to the outbreak of COVID-19 pandemic (Tourism Malaysia, 2021). Indeed, this tremendous number of arrivals indicates a decent sign for the nation's tourism industry. Likewise, Sarawak, a state located in Malaysia has also witnessed remarkable arrival of tourists amounting 4,662,419 individuals in 2019 (Jaythaleela, 2021). Thus, it indicates that Sarawak is capable of welcoming huge number of tourists into the state.

However, due to the pandemic's disastrous outbreak in 2020, Malaysia was forced to enact the Movement Control Order which also known as MCO, in order to stop the country's rising COVID-19 cases. This action was resulted in travel restrictions and closed borders which had an impact on the nation's tourism industry. As a result, the industry of tourism in Sarawak has encountered knockbacks in terms of tourist arrivals, which was reduced by 74%, from 4,666,419 as aforementioned to only 1,199,872 in 2020 and a loss of RM 8.69 billion in tourism revenue (Idris, 2021; Jee, 2022). Indeed, the recovery of tourism industry can be aided by new technologies, well-planned and invested technological innovations are not only vital in building safe destinations, but also in addressing current difficulties in the region's tourism economy (Mohamad, 2023). Additionally, digital solutions help to provide contactless and digital transactions, mapping, and helping to successfully resume tourism operations during a pandemic. Virtual Reality (VR) and Augmented Reality (AR) are two instances of digital technologies that are frequently presented in daily lives (Lamberti et al., 2020). Over the years, VR and AR have been widely applied in the ever-changing tourism industry (Guerra et al., 2015). Generally, VR uses real-world visual experience in wholly false computer-generated settings, lowering the barrier of distance for potential visitors who attempt to obtain more information and comprehend a destination prior to decision-making (Bickford et al., 2018).

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On the other hand, customer experience is one of the key factors that will affect how tourists feel during their trips. Presently, it is one of the emerging trends in the current tourism sector (Bergstrom, 2021). Moreover, customer experience is also one of the crucial factors that leads to individuals' loyalty on certain subjects (Lundaeva, 2019). Customer experience is one of the key factors in determining tourists' tendencies to recommend the acknowledged tourism packages that have been introduced to them. Aside from that, the implementation of tourism services and organisational performance is also a crucial motivator for customer experience. As a result, it is critical to comprehend the significant role of digital technologies (i.e., VR and AR) in tourism services as well as the experiential value among tourists (Opote et al., 2020). Nevertheless, due to the poor quality of the technology employed, some tourism experiences following activities offered using VR may not be perceived as genuine as hands-on experiences in the physical environment (Guttentag, 2010; Suhaidi, 2023).

In, numerous VR studies in the past have focused on presence, which is the subjective feeling of being in a location, while having physical presence elsewhere (Witmer and Singer, 1998). Despite the importance of focusing on the determinants of presence, this approach has been ineffective in tourism, leading demands for future researchers to investigate the determinants of presence specifically (Tussyadiah et al., 2018). The present study synthesises the findings of a thorough assessment of literature in regard to tourism, specifically with the emphasis on the behavioural intention to partake VR tourism, while challenges faced during the adoption of VR as well as the extent of these behaviours that may lead to the visit intention to the actual site were highlighted. All in all, this study attempts to explore tourists' perceptions on the significance of media richness of VR, presence in virtual environment (VE), perceived utilitarian and hedonic value towards behavioural intention to use VR alongside intention to visit the actual destination.

LITERATURE REVIEW

Virtual Reality

Virtual Reality (VR) is commonly divided into two categories: immersive VR and non-immersive VR. As the name suggest, immersive VR happens when a user is enveloped in virtual environments (VEs) by wearing head-mounted display (HMD) technology that delivers a full 3D experience in the immersive world, while non-immersive VR enables users to view a VE through a 2-dimensional (2D) screen. To simplify, the interface of immersive VR has high extent of realism, and it provides a multimodal information channel, whereas these are absent in non-immersive VR interface. One recent study has emphasized the use of this new technology since the sense of reality produced by immersive VR is superior, thus its wide application in tourism industry (Lee and Kim, 2021; Hanaa and Abdul, 2023).

Generally, VR tourism is a virtual simulation of an actual site, destination, or visitor experience that intend to serve as a motivator for users' visitations or to expand on past consumer experiences. Subsequently, this new form of tourism encourages efforts to help the obtaining of a greater appreciation of environment for its substitution for actual visitation (Guttentag, 2010), especially for environmentally sensitive sites such as totally protected areas (TPAs).

Moreover, VR tourism can also be utilized as a management tool to educate consumers and promote environment conservations. For instance, Marriott Hotels located in London and Hawaii have used VR technology to market available tour packages to couples around the globe (Bethesda, 2015). Virtual tours allowed potential customers to experience staying in the hotels, seeing the city's landmarks, and travelling the surrounding using the VR headsets. Besides, these gears are also made available in Qantas cabins where they enable travellers on the selected flights to view the Great Barrier Reef virtually. Moreover, Thomas Cook Holidays, a well-known travel service provider uses VR tools to provide virtual helicopter ride, enabling consumers in Manhattan to enjoy a virtual city tour that commences on the roof of the Santorini Hotel (Mandalbaum, 2015). In conjunction with the growing size of VR tourism market and requirements for information management, a better understanding of VR's functionality and its application would be significant to the tourism management as well as marketing (Myung and Hall, 2019; Thong et al., 2020; Chin et al., 2022). Additionally, particularly in Malaysia, several destinations have adopted VR technologies as a part of their strategic implementations, namely RIFT and VAR LIVE which are located in Mid Valley Megamall My Town Shopping Centre, Kuala Lumpur accordingly, where 3D features are incorporated in existing theme parks and museums (Malaysia Investment Development Opportunity, 2020). Following that, destination in Sarawak has also placed VR technologies into practice, specifically D-Virtual Park which is located in the division of Kota Samarahan. The respective facility was the first theme park in Borneo to integrate VR technologies, its operation was initiated since 17 July 2020, founded as part of state's determined attempt to revolutionise and improve the digital entertainment landscape for both locals and visitors (Chua, 2020; Wen et al., 2023).

Stimulus-Organism-Response (S-O-R) Model

According to Mehrabian and Russell (1974), the fundamentals of S-O-R model, namely Stimulus, which is the major subset that leads to Organism (emotional response), eventually leads to the fostering of Response (behavioural reaction; Zhu and Deng, 2020). Moreover, this model depicts how an organismic component connects stimulation to human behaviour (i.e., response and action). Generally, the respective component consists of both biological (i.e., sensory organs, neurological system and muscular system) and psychological (i.e., Learning, perception, emotion, motivation and reasoning) structures alongside their processes. Subsequently, mental activity, as a consequence of stimulus, motivation, experience, and knowledge, can be differentiated into mental states (i.e., emotions, imagery, thoughts) and mental processes (i.e., judgement, reasoning, appealing to oneself, asking oneself). Self-regulated interactions with objects, machines, animals, or people are based on perception and mental activity that is based on the activity of brain systems (Buxbaum, 2016). On the other hand, response is the result of an individual's behaviour, which reflects the positivity and negativity of behavioural responses (Famiyeh et al., 2018). Following the S-O-R model, it is also defined as a stimulus that impacts on the individual's internal

organismic state. The organism is usually referred to a mediating process on an individual's stimulus and response interaction, consequently, the reaction aids the measurement of customer satisfaction or avoidance behaviour (Hsu and Tsou, 2011).

In addition, Mehrabian and Russell (1974) have postulated that individuals are capable of making own decisions and respond based on their choices. Indeed, the S-O-R model is regarded as the best option for the present context as it has been widely used in the behavioural studies. In this study, the S-O-R model was applied by considering the viewpoint of tourists, especially regarding media richness and presence as stimuli, followed by utilitarian value and hedonic value as elements for organism, followed by visit intention to actual tourism sites as the indicator for response. Additionally, the S-O-R paradigm was proven to be effective in understanding behavioural differences caused by a variety of marketing stimuli and cognitive processes. The S-O-R framework is simply adaptable (Jacoby, 2002) and it enables researchers to view at a variety of internal factors, exterior and internal stimuli; tangible and immaterial stimuli; experience and non-experiential stimuli, attitude, emotion, perception/feeling, judgement, belief, motivation, and reasoning, as well as several other non-experiential organisms (Sultan et al., 2021). Moreover, the application of this framework is deemed applicable as it has been extensively used to discuss behavioural intention to put VR technology into tourism practice and its impact on the visit intention to actual tourism sites (Kim et al., 2018). Thus, in the present study, the S-O-R model was used to examine tourists' intention to use VR technology towards their intention to visit the actual destinations.

Visit Intention

A tourist's strategy for future travel behaviour becomes cognizable as a "visit intention." In tourism studies, this intention to visit has been broadly examined as an indication of client's degree of loyalty (Thong et al., 2020). As the name suggests, visit intention refers to a tourist's desire to return to a location within a specific time frame (Chen et al., 2014; Handler and Kawaminami, 2023). Visit intention also refers to the likelihood of what tourists experience for a specific period of time in order to form subjective perceptions, which eventually influence their behaviour and ultimate decisions (Whang et al., 2016). Consequently, the present study attempts to establish the definition of travel desire as a source of inspiration or encouragement for travellers to visit the actual tourism site.

Media Richness

During epidemic due to COVID-19 pandemic, the initiation of travel restrictions has caused most tourism activities to be constrained, resulted in inability for travellers to perform travel actions. Nevertheless, to stay competent in the tourism market, travel destinations and travellers have increasingly adopted new technologies such as VR (Law et al., 2019). The travellers will be experiencing the moments and experience of the actual travelling site through the Virtual Reality technology. Therefore, media richness is one of the important elements in influencing and impacting user experience (Li et al., 2012). Moreover, media richness is referred to the relative ability of a communication channel to transmit messages containing rich information (Carlson and Zmud, 1999). Subsequently, the richness in media tends to improve as the number of triggers increase, while reduces message ambiguity, eases consumers' interpretation, and promotes understanding of the message conveyed (Maity et al., 2018; Lee, 2022). Besides, numerous studies have identified the significant impact of product attribute (i.e., media richness) towards one's utilitarian and hedonic value (Voss et al., 2003; Li et al., 2012; Krystof and Richter, 2017). Thus, the following hypotheses are formulated:

H1: Media richness is positively and significantly related to the utilitarian value.

H2: Media richness is positively and significantly related to hedonic value.

Presence

Presence is regarded as one of the most important elements for tourists to experience the feelings of being physically attended the actual tourism destination, specifically through VR technology (Lee, 2004). The absence in regard to the sense of presence while using VR tends to affect travel and users experience. Additionally, presence is often defined as the sense of being in a physical environment, while telepresence refers to the experience of existence in a domain through a communication medium (Lee and Kim, 2021). Accordingly, user's sense of presence is described by their possession of feeling, engagement, perception, and sensation when an activity is performed. Numerous scholars in the past have defined and operationalized presence in various ways, but the most prevalent definition when individuals feel "being there" in a virtual environment (VE; Witmer and Singer, 1998; Runia, 2006). Following that, presence is also referred to "the subjective feeling of being in one place or setting, even though physically located in another" (Witmer and Singer, 1998). Generally, presence requires an individual's ability to shift attention from the physical environment to the VE, as well as the capability to exclude extraneous inputs from the respective user's physical surroundings (Cummings et al., 2012). Ultimately, past studies have indicated that the positive relationship between presence and utilitarian as well as hedonic value (Lee and Kim, 2012; Kardong-Edgren et al., 2019), thus the formulation of the following hypotheses:

H3: Presence is positively and significantly related to the utilitarian value.

H4: Presence is positively and significantly related to hedonic value.

Utilitarian Value

Utilitarian value is commonly referred to the rationale in the process of decision making and usually related to the fulfilment of one's functional demands (Lin et al., 2018). Utilitarian values are primarily functional, instrumental, and cognitive in character, and serves as a means to an end. Subsequently, they are widely associated with logical reasons of time, location, and possession requirements (Chandon et al., 2000). Indeed, the behaviour of consumer is value-driven, where their decisions are often influenced by perceived values (Batra and Athola, 1991). Accordingly, perceived utilitarian

value helps to define tourist’ intention to visit to a tourism destination (Choi et al., 2015), while perceived usefulness influences the inclination to adopt VR technology in planning their trips (Lee and Kim, 2021). Subsequently, previous studies have indicated the positive relationship between the utilitarian value and the behavioural intention (Ryu et al., 2008; Hanzaae and Rezaeyeh, 2013; Kusumawardani et al., 2023). Thus, the following hypothesis is proposed:

H5: Utilitarian value is positively and significantly related to the behavioural intention.

Hedonic Value

In contrast to goal achievement, hedonic value is recognised through enjoyment and pleasure (Hirschman and Holbrook, 1982). Hedonic value refers to the delight and pleasure that customers expect from their purchases as well as their enjoyment (Bakirtas and Divanoglu, 2013). In general, to acquire satisfaction and pleasure from acquisitions, most consumers are influenced by several motivational factors (Sangkoy and Tielung, 2015). Hedonic value would influence the judgement of consumer through an automated process (Lin et al., 2018). Besides, hedonic value is described as "more subjective and personal than its utilitarian equivalent, originating from fun and playfulness than fulfilment (Hirschman and Holbrook, 1982; Hirschman, 1983). Hedonic values are non-instrumental, experiential, and affective in nature, and are frequently linked to intangible retailer or the product features.

Indeed, hedonic value is more subjective and personal in comparison with utilitarian value (Ryu et al., 2010; Yang and Lee, 2010). Consumers quantify subjective experiences of enjoyment, fun, and playfulness that they obtain from using a product or service from a hedonic value perspective (Babin et al., 1994). Consequently, from the hedonic point of view, consumers expect a pleasurable experience during the purchase or use process, which eventually influence their decision-making when they are satisfied with consumption, particular VR in this instance (Pantano and Corvello, 2014). Moreover, numerous studies have identified the positive impact of consumers’ perceived hedonic value on their behavioural intention (Basaran and Buyukyilmaz, 2015; Lee and Kim, 2021; Ma et al., 2023). Thus, the hypothesis is proposed as follows:

H6: Hedonic value is positively and significantly related to the behavioural intention.

Behavioral Intention to Use Virtual Reality

Behavioural intention is the motivating component of a volitional conduct, according to the Theory of Reasoned Action (TRA; Fishbein and Ajzen, 1975), and it is closely associated with one’s behaviour (Liu and Jang, 2009). Likewise, behavioural intention is also known as the degree to which a person is motivated to carry out certain behaviours (Ajzen and Fishbein, 1980). Generally, behavioural intention is deemed significant in its role as a determining factor of behaviour (Vallerand et al., 1992; Soliman and Abou-Shouk, 2015). Additionally, Zeithaml et al. (1996) have mentioned that an organization’s behavioural objective can indicate either favourable or unfavourable results. Positive behavioural intentions include positive word-of-mouth (WOM), decent level of loyalty and willingness to spend, while undesirable behavioural intentions comprise negative WOM and switching to competitors (Zeithaml et al., 1996). Additionally, behavioural intention is referred to a consumer’s predisposition to behave in a certain way toward a product or service (Atunel and Kocak, 2017). Last but not least, scholars have suggested the significant positive impact of consumers’ behavioural intention on their visit intention to actual tourism destinations (Duong et al., 2022). Thus, the hypothesis is proposed as below:

H7: Behavioural intention is positively and significantly related to the visit intention to actual site.

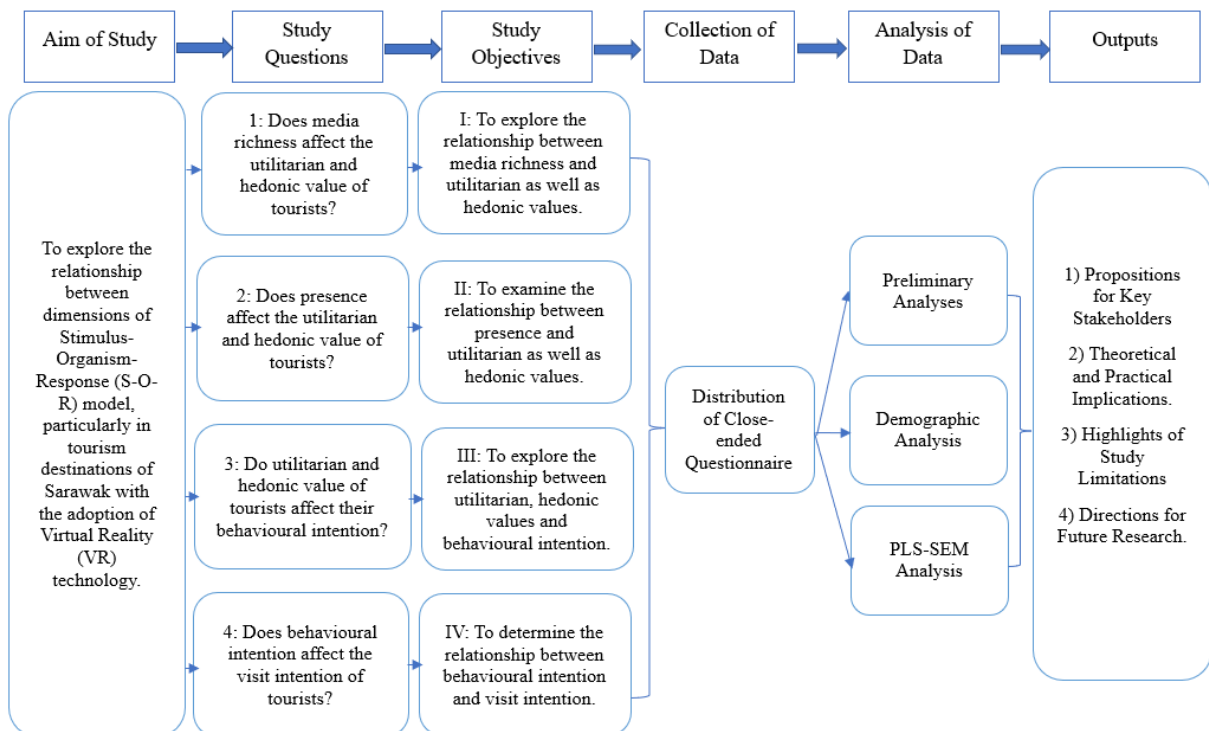


Figure 1. Flowchart of the Study

METHODOLOGY

The present study has taken place at tourism destinations in Sarawak, particularly those that have adopted VR technology. The focus of this study was on East Malaysia VR tourism sites for its emerging number of efforts taken by local government to promote digitalization in economy (Lau and Kong, 2019; Ling, 2022). Subsequently, the data was collected from each part of Sarawak including the major cities in Sarawak such as Kuching, Sibü, Bintulu, Miri as well as smaller towns comprising Limbang, Song, Bintangor, Mukah and Saratok. Indeed, this wide range of selection enables the understanding of different perspectives from all parts of Sarawak, primarily from different geographical and cultural backgrounds. Following that, the process of data collection has commenced from April 2022 to August 2022, for a total duration of 5 months as illustrated in Figure 1. In the present study, the data collection was performed using a quantitative method, particularly through the distribution of questionnaires which was adapted from past studies (El-Said and Aziz, 2021; Lee and Kim, 2021; Li et al., 2021; Schiopu et al., 2021) and tailored to Malaysian setting. In general, the survey questionnaire comprised a total of two sections, the first section, namely Section I, which contains a total of five items, were used to collect the demographic characteristics of the respondents such as their age, origins, and ethnicities. Accordingly, Section II investigated respondent’ perceptions on perceived utilitarian as well as hedonic value in relation to behavioural and visit intention using a total of 35 measurement items. The respondents’ demographic profiles are tabulated in Table 1.

Table 1. Demographic Profile of Respondents

Respondents (N=250)			
Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	114	57.6
	Female	106	42.4
Age	16 to 20 years old	29	11.6
	21 to 25 years old	164	65.6
	26 to 30 years old	13	5.
	31 to 35 years old	14	5.6
	36 to 40 years old	17	6.8
	41 years old and above	13	5.2
Ethnicity	Malay	20	8.0
	Dayak	13	5.2
	Chinese	193	77.2
	Indian	2	0.8
	Others	22	8.8
Monthly Income	RM 1,200 and below	176	70.4
	RM 1,201 – RM 2,400	35	14.0
	RM 2,401 – RM 3,600	11	4.4
	RM 3,601 – RM 4,800	12	4.8
	RM 4,801 – RM 6,000	5	2.0
	RM 6,000 and above	11	4.4
Location	Kuching	71	28.4
	Sibü	117	46.8
	Sarikei	8	3.2
	Bintulu	16	6.4
	Miri	9	3.6
	Limbang	3	1.2
	Song	1	0.4
	Kapit	2	0.8
	Saratok	1	0.4
	Bintangor	1	0.4
	Mukah	2	0.8
	Others	19	7.6

Table 2. Total Variance Explained (Note: Extraction Method Using Principal Component Analysis)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.466	38.474	38.474	13.466	38.474	38.474
2	2.714	7.755	46.229	2.714	7.755	46.229
3	1.709	4.883	51.112	1.709	4.883	51.112
4	1.470	4.200	55.312	1.470	4.200	55.312
5	1.307	3.735	59.047	1.307	3.735	59.047
6	1.086	3.102	62.149	1.086	3.102	62.149
7	1.026	2.931	65.081	1.026	2.931	65.081
8	.907	2.592	67.673			
9	.835	2.386	70.059			
10	.781	2.232	72.291			
11	.752	2.148	74.439			
12	.708	2.022	76.461			
13	.650	1.857	78.318			
14	.591	1.688	80.006			
15	.553	1.579	81.586			
16	.530	1.514	83.100			
17	.501	1.433	84.533			
18	.492	1.407	85.939			
19	.450	1.287	87.226			
20	.436	1.247	88.473			
21	.408	1.166	89.639			
22	.386	1.102	90.741			
23	.356	1.017	91.758			
24	.337	.963	92.721			
25	.330	.944	93.665			
26	.319	.913	94.577			
27	.311	.889	95.466			
28	.268	.766	96.233			
29	.250	.714	96.947			
30	.229	.655	97.602			
31	.218	.622	98.224			
32	.194	.555	98.779			
33	.162	.463	99.242			
34	.149	.426	99.668			
35	.116	.332	100.000			

A seven-point Likert scale was used in this study, specifically range from 1 to 7, where 1 represented strongly disagree while 7 represented strongly agree to the measurement item, according to Dr. Rensis Likert. The respondents participated in this survey were tourists who have visited VR tourism destinations in Sarawak. Next, by using G*Power software (Faul et al., 2007), a minimum sample size of 178 was determined, as shown in Figure 2, primarily computed based on statistical power of 0.80 and presumption value of 0.15 for effect size at 5% significance level.

Subsequently, a non-probability sampling method (Sekaran and Bougie, 2013), namely purposive sampling was used in the selection of respondents, where the minimum age for respondents to be chosen was controlled at 16, presuming better

level of understanding of measurement items, thus generating more reliable outcomes. Moreover, prior to survey participation, the researchers have achieved a consensus with these selected respondents, enabling them to rate each measurement item based on their level of agreement. All in all, out of the 300 distributed questionnaires, 265 sets were returned, indicating a response rate of 88%, thus confirming the absence of response error (Nulty, 2008). The procedure was followed by several preliminary analyses using the Social Sciences Statistical Package (SPSS) 28.0, as a consequence, a total of 15 questionnaires were discarded due to straight-lining response and absence of certain information. Accordingly, a partial least squares-structural equation modeling (PLS-SEM) was conducted using WarpPLS 8.0 (Kock, 2022) to assess the proposed research model as shown in Figure 3, particularly through path modeling and bootstrapping.

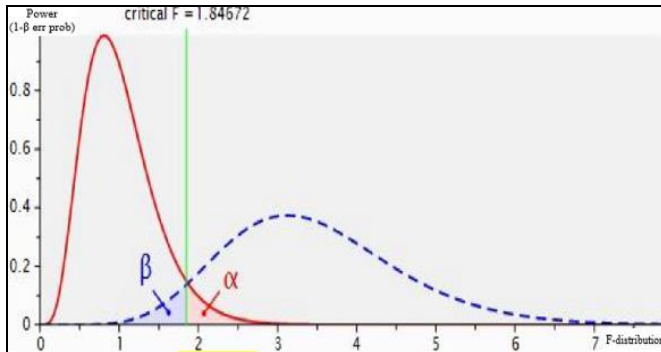


Figure 2. Results of G*Power Analysis

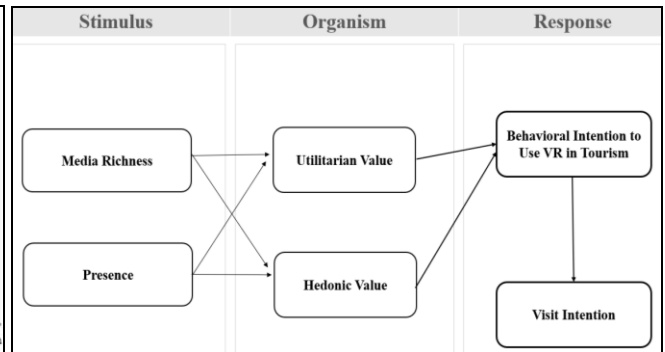


Figure 3. Research Model

Table 3. Results of Measurement Model

Model Construct	Measurement Item	Loading	CR ^a	AVE ^b	Loading	CR ^a	AVE ^b
		First Iteration			Final Iteration		
Media Richness (MR)	MR_1	0.763	0.808	0.584	0.763	0.808	0.584
	MR_2	0.769			0.769		
	MR_3	0.761			0.761		
Presence (PRE)	PRE_1	0.736	0.882	0.455	0.797	0.869	0.624
	PRE_2	0.637			Omitted		
	PRE_3	0.705			0.830		
	PRE_4	0.634			Omitted		
	PRE_5	0.733			0.785		
	PRE_6	0.639			Omitted		
	PRE_7	0.708			0.746		
	PRE_8	0.670			Omitted		
	PRE_9	0.594			Omitted		
Utilitarian Value (UV)	UV_1	0.862	0.891	0.731	0.862	0.891	0.731
	UV_2	0.853			0.853		
	UV_3	0.850			0.850		
Hedonic Value (HV)	HV_1	0.845	0.907	0.765	0.845	0.907	0.765
	HV_2	0.878			0.878		
	HV_3	0.901			0.901		
Behavioural Intention (BI)	BI_1	0.748	0.910	0.591	0.748	0.910	0.591
	BI_2	0.739			0.739		
	BI_3	0.730			0.730		
	BI_4	0.816			0.816		
	BI_5	0.786			0.786		
	BI_6	0.789			0.789		
	BI_7	0.771			0.771		
Visit Intention (VI)	VI_1	0.779	0.945	0.634	0.779	0.945	0.634
	VI_2	0.823			0.823		
	VI_3	0.838			0.838		
	VI_4	0.814			0.814		
	VI_5	0.815			0.815		
	VI_6	0.779			0.779		
	VI_7	0.781			0.781		
	VI_8	0.783			0.783		
	VI_9	0.800			0.800		
	VI_10	0.746			0.746		

Table 4 Discriminant Validity of Constructs

	MR	PRE	UV	HV	BI	VI
MR	0.764					
PRE	0.361	0.790				
UV	0.385	0.404	0.855			
HV	0.387	0.362	0.616	0.875		
BI	0.438	0.398	0.640	0.591	0.769	
VI	0.402	0.351	0.702	0.595	0.675	0.796

Note: MR = Media Richness; HV = Hedonic Value; PRE = Presence; BI = Behavioral Intention; UV = Utilitarian Value; VI = Visitation

Table 5. Results of Cronbach's Alpha

Model Construct	Measurement Item	Cronbach's Alpha	Loading Range	Number of Items
Media Richness (MR)	MR_1	0.644	0.761-0.769	3(3)
	MR_2			
	MR_3			
Presence (PRE)	PRE_1	0.799	0.746-0.830	4(9)
	PRE_3			
	PRE_5			
	PRE_7			
Utilitarian Value (UV)	UV_1	0.816	0.850-0.862	3(3)
	UV_2			
	UV_3			
Hedonic Value (HV)	HV_1	0.846	0.845-0.901	3(3)
	HV_2			
	HV_3			
Behavioural Intention (BI)	BI_1	0.884	0.730-0.816	7(7)
	BI_2			
	BI_3			
	BI_4			
	BI_5			
	BI_6			
	BI_7			
Visit Intention (VI)	VI_1	0.936	0.746-0.838	10(10)
	VI_2			
	VI_3			
	VI_4			
	VI_5			
	VI_6			
	VI_7			
	VI_8			
	VI_9			
	VI_10			

FINDINGS

Common Method Variance (CMV)

In this study, the SPSS software version 28.0 (O'Connor, 2000) was used to testify the issue of the common method variance (CMV), specifically through a Harman's single-factor test. The measures studied

in this study were included in an exploratory factor analysis and all these measurements are included under the presumption that the first factor loading shall not exceed 50% (Aulakh and Gencturk, 2000). As shown in Table 2, the result where the first loading is 38.474% where it did not exceed the 50%, thus indicated that the results were free from the issue of method biases.

Assessment of the Measurement Model

In this study, the proposed model was evaluated using a confirmatory factor analysis (CFA), with the purpose to examine the scales' reliability, convergent validity, and discriminant validity. As demonstrated in Table 3, as a rule of thumb, each item must achieve a minimum loading of 0.70 to be deemed acceptable and to ensure internal consistency (Bagozzi et al., 1991). On top of that, the validity of the construct was evaluated using composite reliability (CR), where the value of CR must meet the minimal cut-off point of 0.70 (Chin, 2010). Likewise, the value of average variance explained (AVE) must be at least 0.50 (Fornell and Larcker, 1981). As a result, the values for both CR and AVE have met the suggested minimum requirements. Table 4 shows the measures' discriminant validity, primarily comprised assessment of inter-correlation among the constructs using square rooted values of AVE, where the correlation values obtained must be higher than each other (Fornell and Larcker, 1981; Chin, 2010). Following evidence on accuracy, convergent and discriminant validity, the present measurement model was deemed appropriate.

Reliability Test

The assessment was subsequently followed by the computation of Cronbach' alpha values to testify the reliability of the instruments (Cronbach, 1951). Generally, scholars in the past have suggested the values of Cronbach's alpha be at least 0.80 to represent an extent that is deemed decent, followed by values between 0.61-0.79 to be regarded as acceptable, while 0.60 and below represents weak level of acceptance. Consequently, as Table 5 shows, the values of Cronbach's alpha for all tested constructs, namely media richness, presence, utilitarian value, hedonic value, behavioural intention and visit intention are at a decent level.

Coefficient of Determination (R²)

In this study, the coefficient of determination (R²) was computed to determine whether the model's existence was either significant, moderate, or weak in forecasting the approximate actual data points (Hair et al., 2017). Subsequently, as tabulated in Table 6, the value of the R² for utilitarian value was 0.261 (moderate), hedonic value was 0.245 (moderate), followed by behavioural intention which was 0.498 (moderate) and visit intention was 0.457 (moderate).

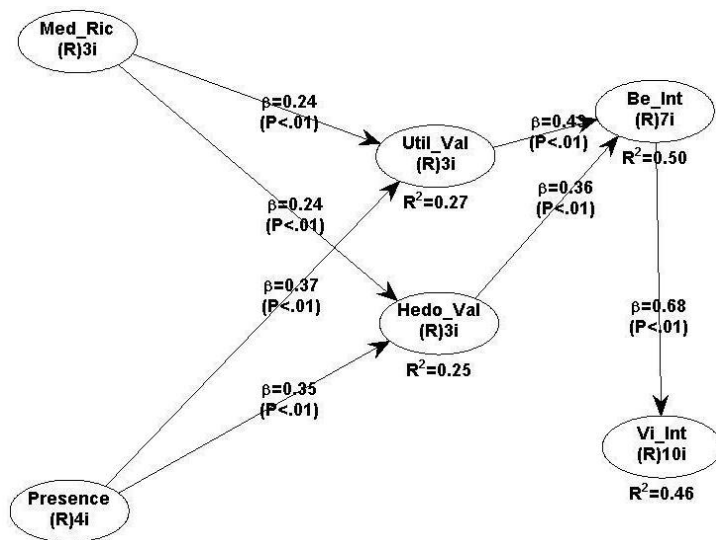


Figure 4. Results of the structural model

Table 6. Results of R-squared values

Constructs(s)	R-squared value
Utilitarian Value	0.261
Hedonic Value	0.245
Behavioural Intention	0.498
Visit Intention	0.457

Table 7. Results of Q-squared values

Constructs(s)	Q-squared value
Utilitarian Value	0.267
Hedonic Value	0.250
Behavioural Intention	0.498
Visit Intention	0.462

Predictive relevance (Q²)

The Q² values were obtained to explain the predictive value of the data. The minimum requirement for Q² value was suggested to be greater than zero value (Hair et al., 2017). As Table 7 shows, all the Q² values have exceeded value of zero.

Table 8. Results of hypotheses testing

Hypotheses	Relationship	Beta	p-Value	t-Value	Decision	f ²	VIF
H1	media richness-utilitarian value	0.239	<0.001	3.947	Supported	0.094	1.345
H2	media richness-hedonic value	0.244	<0.001	4.027	Supported	0.095	1.304
H3	presence-utilitarian value	0.369	<0.001	6.217	Supported	0.173	2.417
H4	presence-hedonic value	0.346	<0.001	5.812	Supported	0.156	1.898
H5	utilitarian value-behavioural intention	0.425	<0.001	7.231	Supported	0.277	2.261
H6	hedonic value-behavioural intention	0.360	<0.001	6.055	Supported	0.226	2.472
H7	behavioural intention-visit intention	0.677	<0.001	12.035	Supported	0.459	1.501

Assessment of the Structural Model

As aforementioned, a total of 7 directional hypotheses were established based on the developed research model. Generally, two out of the seven hypotheses (H1-H2) were formulated to examine the direct relationships between media

richness, presence, utilitarian value and hedonic value, while H3 and H4 investigated the direct relationships between utilitarian value, hedonic value and behavioural intention. Last but not least, the remaining hypothesis (H7) assessed the direct relationship between behavioural intention and visit intention.

To investigate all the said hypotheses, the WarpPLS software was utilized; thus, the results comprising regression weights, bootstrap critical ratios p -value along with R^2 to explain the model's endogenous linkages (O'Cass and Frost, 2002) were demonstrated in Figure 4 and Table 8. Moreover, the effect size (f^2) was also measured and with the purpose to calculate the strength between independent and dependent variables.

DISCUSSION

In the present study, H1 was proposed to examine the relationship between media richness and utilitarian value, particularly in the context of tourism in Malaysia. In line with the preceding study (Li et al., 2012), the statistical findings have indicated that the media richness of virtual reality had a significant impact on one's utilitarian value; thus, H1 was supported. Accordingly, the richness of media can be an emphasis for tourism destinations, with the purpose of encouraging these VR users towards favourable behavioural intention. Subsequently, the relationship between media richness and hedonic value was investigated in H2. Undoubtedly, the outcomes were aligned with previous studies (Li et al., 2012; Maity et al., 2018), indicating the significance of media richness on the respective users' hedonic value, hence H2 was supported. Indeed, an effective communication channel is often accompanied by rich information, enabling transmission of relevant travel particulars such as availability of tourism attractions in desired destinations. Consequently, comprehensive media contents in VR environment may lead to advantageous decision-making among both potential and existing tourists, which eventually contributes to sustainable development of a tourism destination.

Consecutively, in accordance with the study in the past (Lee and Kim, 2012), statistical results from the analyses demonstrated the significant impact of presence on the utilitarian value of VR users, thus supporting H3. Generally, virtual environments (VE) that provide an adequate extent of presence helps to generate more positive behaviour for their users, specifically VR tourists in this case. Additionally, H3 was proposed to examine the relationship between presence and hedonic value. Likewise, the statistical findings have indicated that the users' sense of presence had a significant impact on their hedonic value, thus H4 was supported and in line with previous study (Lee and Kim, 2012). VEs that provide users with great sense of presence tend to be a considerable driver for users to make decisions that are beneficial to tourism destinations, as they find the experience enjoyable and fun, thus creating satisfactory amount of interest among these individuals. Subsequently, the formulation of H5 was to investigate the relationship between users' utilitarian value and their behavioural intention. The results were undoubtedly aligned with previous studies (Hanzaee and Rezaeyeh, 2013; Choi et al., 2015), indicating that utilitarian value had significant impact on one's behavioural intention; thus H5 was supported. Generally, almost every consumer in the market is driven by value, which eventually influence their behaviours, especially during the process of decision-making (Ryu et al., 2008; Lee and Kim, 2021).

Moreover, in consistent with past studies (Pantano and Corvello, 2014; Basaran and Buyukyilmaz, 2015), the significance of users' hedonic value was also discovered, thus supporting H6. To simplify, hedonic value provides substantial impact on users' judgement and enjoyment, specifically on the features of a product being utilized. Thus, hedonic value perceived by consumers are likely to lead to promising behavioural intentions of consumers. Last but not least, H7 was formulated to assess the relationship between behavioural intention and visit intention. In line with preceding studies (Choi et al., 2015; Atunel and Kocak, 2017), the present results indicated that users' behavioural intention had significant impact on their intention to visit a destination. In general, tourists or travellers' intention to plan for a trip is usually implied by their behavioural intention, particularly favourable intention, which determines the behaviour of these individuals to consider placing a tourism destination at the top of the list.

CONCLUSION, IMPLICATIONS AND LIMITATIONS

In sum, the present study has investigated the relationship between the elements of the S-O-R (Stimulus, Organism and Response) model, which include media richness, presence, utilitarian and hedonic value as well as behavioural and visit intention to several tourism destinations in Sarawak, Malaysia. Subsequently, this study has provided empirical evidence that indicated the positive correlation between consumers' behavioural intention and their perceived utilitarian as well as hedonic value. Moreover, statistical findings have revealed that consumers' behavioural intention leads to intention to visit to a tourism destination, thus highlighting the importance to ensure favourable utilitarian and hedonic value as perceived by consumers to enhance the profitability and development of a tourism destination in the long run.

Moreover, a number of dimensions contributing to constructive utilitarian and hedonic value and their relationships with behavioural intention was examined, primarily based on tourists' perspectives who visited tourism destinations that offer VR technology. Accordingly, media richness of VR and users' sense of presence were found to be significant contributor to their behavioural intention, thus suggesting the necessity to provide consistent enhancements on the said elements for the assurance of beneficial users' behavioural intention.

Despite the fact that users' behavioural and visit intention to Sarawak have been repeatedly examined by several research in the past, there was no known study was conducted through the adoption of these studied variables, primarily comprised media richness, presence, utilitarian value, hedonic value, behavioural intention and visit intention, particularly in the context of VR tourism. Hence, the present study attempted to provide contributions to the existing literature of VR tourism destinations in Malaysia. Besides, this study is foreseen to contribute to the emblazoning of S-O-R model through its adequate amount of empirical evidence and differentiated contexts. Additionally, based on the

perspective of tourists in Sarawak, the present study reinforces the expansion of knowledge regarding contributing factors of consumers' utilitarian and hedonic value and their impacts on behavioural and visit intention, therefore serves as a potential reference for future research in similar contexts.

In terms of practical implications, the findings offer crucial fundamentals to policy makers and stakeholders in the tourism industry, particularly on the significance of ensuring the employed VR technology enables its users to gain both utilitarian value and hedonic value, which eventually lead to intention to visit the actual tourism destination. Besides, this study makes an effort to comprehend the factors that affect the consumers' perceived values when VR technology is adopted. These findings are valuable and helpful for the local policy planners and business operators regarding the effective implementation of the VR technology at the tourism destination as well as be informed of the potential enhancements on existing implementations.

Furthermore, the present study provides meaningful insights to key tourism industry players, specifically local policy makers, by suggesting the need to consider perceivable values by users when VR technology is adopted, primarily include media richness and presence as discovered by the statistical findings. Indeed, users' perceived utilitarian and hedonic value were found to be significant factors towards favourable behavioural and visit intention. Thus, it is recommended that the respective industry players to place great emphasis on tourists' enjoyment during their visitations, for instance offering discount vouchers and informative brochures to encourage their intentions to revisit.

Nonetheless, this study is not without its limitations. Firstly, the present study only sampled from tourism destinations in Sarawak, specifically those that have applied VR technology, whereas the situations in other contexts remain unaddressed. Thus, the results and conclusions of this geographically restricted survey could be varied. Besides, there are some of the viewpoints that may alter depending on the study location such as sociocultural, the economic as well as the environmental as the study was carried out at only one geographical location.

Therefore, the findings of this study might not be extrapolated to other tourism destination that have applied the VR technology in West Malaysia as well as in other countries. Moreover, stakeholders in a tourism destination in fact comprised more than just visitors or tourists; individuals from the line of local communities and other relevant stakeholders are also included, thus indicating limitations in terms of sampling.

Ultimately, VR tourists' perceived values (i.e., utilitarian and hedonic) are significant contributors to their behavioural and visit intention, nevertheless, these values have high dependency on the media richness and these individuals' sense of presence while using VR. Henceforth, the significance of various stimuli and organisms on users' responses, particularly in terms of behavioural intention and intention to visit to actual tourism destinations was identified. Therefore, it is wise for these stimuli (i.e., media richness and presence) and organisms (i.e., utilitarian value and hedonic value) as well as users' responses (behavioural intention and visit intention) to undergo more thorough investigation in different settings related to tourism context. Last but not least, most of the samples were dispersed in cities of Sarawak, thus witnessed an inadequacy in this distribution. Thus, it is recommended for wider range of perspectives and concepts to be integrated along with the inclusion of respondents such as stakeholders from the supply-side and communities to obtain results that are more indiscriminate.

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