

## VIRTUAL REALITY AS A MARKETING TOOL TO DRIVE CONSUMER DECISION-MAKING

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### ABSTRACT

*Virtual reality (VR) has emerged as a tool for helping tourism marketers in forming realistic customer expectations. Extant literature is available on the technological adoption of VR in business-related fields like marketing and tourism. Still, a gap exists in studying decision-making to visit a destination and attitude towards a tourism destination. This study attempts to cover the gap by investigating decision-making behaviour with respect to VR for selecting a tourism destination. Individuals' decision-making is based on a cognitive or emotional approach; therefore, Elaboration Likelihood Model is used in this research to understand consumer decision-making. Eight face-to-face interviews were conducted from students to identify the most unfamiliar destination. Field experimentation was used to collect data from 216 Malaysian students; one group experienced VR, and another watched a video. The results reveal that the information quality (cognitive approach) of VR plays a significant role in attitudinal change. On the contrary, video positively influences the attitude through information quality and source credibility, but its intensity is low compared to VR. This research makes a substantial contribution for VR marketers to focus on informational aspects while developing a prototype of VR.*

**Keywords:** Virtual reality; elaboration likelihood model; tourism marketing; decision-making; field experimentation.

### INTRODUCTION

Technological advancement plays an essential role in communication, entertainment and marketing processes (Pae & Hyun, 2002; Wolters, 2015). Digital transformations provide new business opportunities and business models that managers must adopt to thrive in the competitive environment (Pagani & Pardo, 2017). Digital transformation through new business models usually changes the conventional business environment, disrupts numerous markets, and alters consumers' behaviour and expectations (Verhoef et al., 2021). Hence, several industries benefited from digital transformation, for instance, music (i.e., Sound Cloud and Spotify), online retailers (i.e., Amazon and Alibaba), transportation (i.e., Curb and Uber), broadcasting (i.e., Netflix and Prime Video) and travelling (i.e., Booking, Agoda and Airbnb). The researchers also investigated its role in different technologies such as the internet (Zhu et al., 2006), social media, mobility, analytics, cloud (Berman & Marshall, 2014), and recently virtual reality (Lee et al., 2021; Shahab et al., 2022a). Virtual reality (VR) is a novel technology, and its potential has been noticed for VR marketing (Loureiro et al., 2019; Shahab et al., 2021). Therefore, the research on VR demands attention from scholars (Flavián et al., 2019).

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Most tourism marketers use conventional communication modes (2D videos, pictures & brochures) to promote tourism destinations. According to Griffin et al. (2017), two-dimensional mediums cannot communicate a destination's true essence. In this context, VR has emerged as a tool for helping tourism marketers in forming realistic customer expectations (Guttentag, 2010). The extant literature deals with the technological adoption of VR in business-related fields like marketing and tourism (Gibson & Rawe, 2017). Still, research gaps exist in studying decision-making to visit a destination and post attitude towards tourism destination (Shahab et al., 2021).

"Try before you buy" phenomenon has changed the market competition (Marasco et al., 2018). VR is capable enough to provide this opportunity by providing a computerized 3D world that senses the movement and reactions of the user, which helps the user to have a feeling of vivid mental representation of the virtual world (Yaoyuneyong et al., 2018). As VR provides potential tourists an experience that is closer than ever before – being there without actually being there – therefore, tourists' expectations will be properly set before they book. Because customers are being rational when buying big-ticket items or services, it becomes necessary to fulfil their need for information before purchase. According to a Priceline study in 2016, about half of Gen Y would use virtual reality to select a tourism destination (Cranmer et al., 2018).

Elaboration Likelihood Model (ELM) – a persuasive decision-making model – is used in this research to address the research gap. ELM has dual persuasion routes to attitudinal change (Forret & Turban, 1996). Decision-making is usually based on emotions or cognitive thinking (Verweij et al., 2015). ELM deals with both the emotional and cognitive processing of consumers. Persuasion refers to convincing communication that influences autonomous opinions, actions and judgements (Simons et al., 2001). In information technology, a persuasive system refers to software or application that alters, reinforces or forms attitudes and behaviours (Fogg, 2002; Oinas-Kukkonen & Harjumaa, 2009). From a business perspective, persuasive communication is considered as ads, speech, reviews, organisational reputation and logos (Sparks et al., 2013). According to Te'eni (2012), new communication technologies have changed the decision-making process, information processing, learning and sharing of knowledge, socialisation and working behaviours. So, it is necessary to study the impact of VR on consumer decision-making.

## **REVIEW OF LITERATURE**

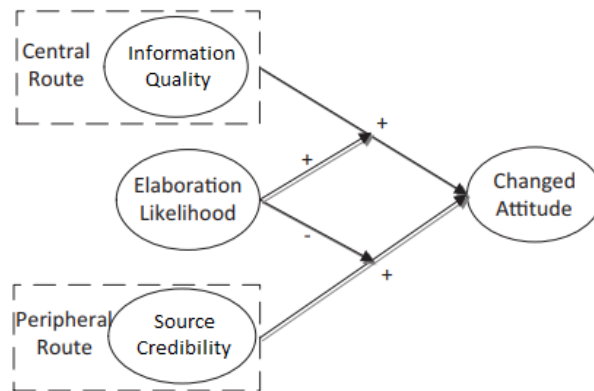
### **Elaboration Likelihood Model**

ELM describes the persuasion, attitudinal formation and behavioural changes through an external mode of information. ELM deals with the exposure of persuasive communication and its response from consumers (Petty & Cacioppo, 1986). ELM describes that the cognitive processing of information does not always back attitudinal changes, but sometimes they are due to cue-based judgments (emotions & attraction). When information is given to an individual in different situations, those individuals react differently in all situations with different cognitive efforts to process the information (Petty et al., 1981). These cognitive variations are responsible for successful persuasion (Angst & Agarwal, 2009). Each individual processes information differently and these processes are known as central routes (CR) and peripheral routes (PR) (Petty & Cacioppo, 1986).

Central route deals with the processing of information, as CR possesses detailed knowledge of the product or service. Consumer assesses the quality of information in terms of relevance, timeliness and accuracy (Chong et al., 2017). So, the central route needs much cognitive effort because of in-depth information processing. For example, if consumers book a travel plan using the tourism mobile application after reading the travel agreement and policy (Yoo et al., 2017). Attitudinal change or formation through CR is more resistant, long-lasting, and predictive of behaviour (Petty & Cacioppo, 1986).

On the other hand, attitudinal change without cognitive effort is known as a peripheral route. Mainly, it is because of the "cues" present in the message. For instance, credibility of communication medium, well-known endorser, visual attraction, and early part of messages (Petty et al., 1981). The reason for the PR is that sometimes people are not interested in using cognitive efforts to process the message or do not have the ability to do so and just follow the cues to process the message (Kerr et al., 2015). Attitudinal change or formation through the peripheral route is short-term, susceptible and un-predictive of behaviour (Petty & Cacioppo, 1986). For example, while booking a tour, a person

only focuses on source credibility (reputation of endorser, trust in technological medium) and visual appeal rather than the information. The visual depiction of ELM is given in figure 1.



**Figure 1.** Elaboration Likelihood Model (ELM)

Consumers have different levels of motivation, curiosity, ability and interest to receive and elaborate the message. These variations in the consumer personality determine the peripheral or central route to process the message (Petty & Cacioppo, 1986). Petty and Cacioppo (1977) named these variations as "Elaboration Likelihood". When elaboration likelihood of an individual is high, CR occurs, whereas PR occurs when elaboration likelihood is low (Petty et al. 1981). Researchers have also used other variables to study the elaboration likelihood instead of motivation, curiosity, etc. Those moderating variables are job relevance, user expertise, social presence, prior knowledge, helpers hand and website interactivity (Bhattacharjee & Sanford, 2006; Kaplan & Haenlein, 2009; Chew & Jahari, 2014; Franco-Valdez et al., 2018; Kwak et al., 2018). ELM has been used in different studies like social psychology (Petty et al., 1981), marketing (Bitner & Obermiller, 1985), social media (Teng et al., 2014), tourism (MacDonald et al., 2016), and information technology (Gu et al., 2017).

**Theory of Planned Behaviour**

Intentions towards behaviour can be predicted through subjective norms, perceived behavioural control, and attitude towards the behaviour (Ajzen, 1991). Theory of planned behaviour (TPB) argues that attitude predicts intention, and intention predicts behaviour. There are three considerations for human action: (1) person's own beliefs to perform a behaviour are known as behavioural beliefs, (2) beliefs that are characterised by society and normative expectations of family, friends etc. are known as normative beliefs, (3) beliefs that may help in performing or avoiding the behaviour is considered as control beliefs. All beliefs have been identified as an independent variable in TPB, like attitude (favourable/unfavourable) towards the behaviour will be formed by behavioural beliefs. Perceived subjective norm or social pressure will be formed by normative beliefs and perceived behavioural control (PBC) through control beliefs. Altogether, these independent variables result in behavioural intention (Bamberg et al., 2003). This research intends to incorporate TPB with ELM and study them with VR.

**Reasons for using VR with video**

The impact of advertisement in influencing consumer belief and attitude towards tourism destination has been considered as a mature research area (e.g. Shimp, 1981). Advertisement helps in promoting a destination by giving an insight about the destination just like a fantasy or daydream style, in which consumers can feel the experience of product/service (Walters et al., 2007). Tourism marketers use the same visual communication modes to promote a destination and influence the intention to visit (Aziz & Zainol, 2011), but now consumers are more resilient to these traditional modes of communication and are having less impact of advertisement (Fransen et al., 2015). Virtual reality has a more significant impact on potential visitors in creating an affective and conative destination image than video (Griffin et al., 2017). VR can help marketers to replicate the real experience for consumers (Papagiannidis et al., 2014) in a complete computer-mediated environment (Rauschnabel et al., 2022). Therefore, this research has compared the impact of VR and video on consumer behaviour to provide a suitable media for tourism marketers.

### Research model and hypotheses

ELM has two main independent variables, i.e. information/argument quality and source credibility. Information/argument quality follows the central route, and source credibility follows the peripheral route (Gu et al., 2017). Bhattacharjee and Sanford (2006) studied the argument quality and source credibility in adopting document management systems. Ho and Bodoff (2017) conducted a study by integrating ELM with consumer search theory to identify the attitudinal formation and relationship of consumer behaviour with attitude. Chen and Lee (2008) examined the impact of online reviews on attitudinal change. The researchers have also explored the impact of IQ and SC in changing/forming the attitude towards destination selection (Shu & Scott, 2014) and online reviews on accommodation adoption (Filiberti & McLeay, 2014). Furthermore, it is evident that ELM has been well adopted in past studies related to video ads (Moyer-Guse & Nabi, 2010; Flynn et al., 2011).

VR has been used in different fields of studies like education (Huang et al., 2019), healthcare (Fisher et al., 2019), in-store experience (Farah et al., 2019), virtual grocery store (Lombart et al., 2019), training (Wang et al., 2018), virtual dressing room (Beck & Crié, 2018), entertainment (MacQuarrie & Steed, 2017), architecture & environmental planning (Portman et al., 2015) and virtual test driving (Papagiannidis et al., 2014). VR and augmented reality (AR) have a strong potential to promote the tourism industry (Fauzi & Gozali, 2015; Shahab et al., 2022b). As discussed earlier, consumers are more resilient towards traditional modes of communication. VR can help in provoking the attitude towards purchase intention. The concept of VR is still new, it is growing, and many companies are trying to integrate VR into their functions and researchers are also playing their role in this integration. Tourism organisations are using VR to provide an experience of cruise tour, hotel and travel experiences (Vitaliev, 2016). Extant literature is available on the use of VR in tourism fields like enhanced experiences (Bonetti et al., 2018), full immersion (Castro et al., 2017), engagement (Gibson & O'Rawe, 2018), entertainment (Moorhouse et al., 2018), social interactions and connectivity (Castro et al., 2017), personalisation and accessibility (Guttentag, 2010). This study proposes the decision-making quality of consumers in selecting a tourism destination with the use of VR and video. Therefore, the following hypotheses have been proposed:

**H1.** Information quality will positively influence the attitude towards tourism destination for a customer using virtual reality as compared to video users

**H2.** Source credibility will positively influence the attitude towards tourism destination for a customer using virtual reality as compared to video users

### Incorporating ELM with TPB

This study explores users' IT-related behaviour through an influenced process lens (see figure 2). ELM is adopted to demonstrate variations in attitude of an individual. Attitudinal change is a dependent variable in ELM that is expanded to intention to visit derived from TPB. This research used the theoretical framework given by Wang (2015) by incorporating ELM with TPB. Behavioural intention is an outcome of attitude towards behaviour, as illustrated by the famous psychological theory – TPB (Ajzen, 1991). Previous studies have used TPB to study the association between tourists' intention and attitude (Huang & Hsu, 2009; Lam et al., 2017). Another study concluded that attitude towards tourism destination predicts intention to visit, and together they can predict a behaviour (Phillips et al., 2013). The same results were identified by Phillips et al. (2013) when "attitude toward consuming" resulted in Korean visiting intention to try local Korean food. In this study, the researcher follows TPB's logic that behavioural intention can be predicted by an attitude towards a behaviour (Wang, 2015). As supported by previous literature, it could be proposed that attitude towards tourism destination is a predictor of intention to visit:

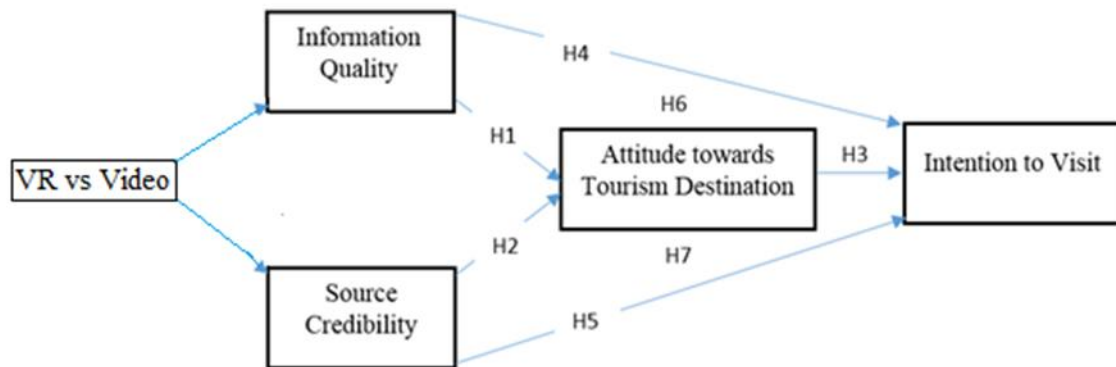
**H3.** Attitude towards tourism destination will positively influence intention to visit for a customer using virtual reality as compared to video users

TPB proposes that an individual's favourable behaviour can be prescribed to their existing resources. Such behaviour of an individual imitates the perceived behavioural construct of TPB model. Ajzen (1991) identified several beliefs based on consumers' experiences or any persuasive information from their relatives, friends and peers about the intention that ultimately results in behaviour. On the other hand, TPB cannot explain the reason for temporal or persistent behaviour (Wang, 2015). Therefore, to overcome the temporal or persistent behavioural issue, TPB had been incorporated with ELM to identify the behavioural intention. As discussed earlier, ELM has two routes (central or peripheral) which will help in studying the temporal or persistent behavioural

change. Extant studies have been conducted on the role of information quality and source credibility on behavioural intention (Leong et al., 2017; Wang, 2015). Thus, the following hypotheses are proposed:

**H4.** Information quality will have a direct positive influence on the intention to visit for a customer using virtual reality as compared to video users

**H5.** Source credibility will have a direct positive influence on the intention to visit for a customer using virtual reality as compared to video users



**Figure 2. Proposed Model**

As discussed earlier, it is evident from the literature that information quality and source credibility significantly impact attitude towards tourism destination and intention to visit. Therefore, this study proposes the following hypotheses:

**H6.** Attitude towards tourism destination will significantly mediates the relationship between information quality and intention to visit for a customer using virtual reality as compared to video users

**H7.** Attitude towards tourism destination will significantly mediates the relationship between source credibility and intention to visit for a customer using virtual reality as compared to video users

## RESEARCH METHODS

### Measurement Scale

The measurement scale was adapted from previous research and modified some items to fit better according to the current research context. A seven-point Likert scale ranged from 1 (strongly disagree) to 7 (strongly agree). A total of 17 items were used to measure four constructs of the model (two items were deleted due to low factor loading), number of items and their sources are mentioned in Table 1.

**Table No. 1 Items Detail**

Constructs	No. of items	Sources
Information quality	4	Bhattacharjee and Sanford (2006); Yoo et al. (2017)
Source credibility	5	Bhattacharjee and Sanford (2006); Yoo et al. (2017)
Attitude towards tourism destination	3	Ko et al. (2005)
Intention to visit	3	Alvarez and Campo (2014); Molinillo et al. (2018)

### Sampling, Procedure, Stimuli & Data Collection

The experimental design was adopted from Molinillo et al. (2018) by showing the different modes of communication (VR or Video) to respondents. Young customers are more interested in using virtual reality. Therefore, students were selected as a target population to represent the customers likely to experience and be influenced by VR (Halvorson et al., 2011). As per the nature of this study, interviews were conducted from eight Malaysian students to identify the most unfamiliar destination among students. The reason for identifying the unfamiliar destination was to avoid any biases due to earlier knowledge about the destination. Different questions related to culture, economy, weather, geography & tourism were asked from students. According to their responses, Australia was identified as the most unfamiliar destination, followed by Turkey (Table 2). One university based in Kuala Lumpur was selected purposively to get the maximum number of Malaysian respondents. This

research used field experimentation for data collection. It is evident from the literature that field experimentation plays a vital role in studies involving new technology adoption compared to outdated technology (Dupas, 2014). The researcher approached groups of students, and they were randomly exposed to video (Control group) or VR about Australian tourism (experimental group). VR headset "Samsung Gear VR" was used to collect the data. To avoid personal biases, only those respondents who have not visited Australia were asked to participate. Data were collected from 216 respondents; out of them, 110 experienced VR, and 106 watched a video. Table 3 shows the demographics of the respondents.

**Table No. 2 Interviews Summary**

S. No	Question	Australia	Indonesia	Turkey	Thailand
1	What are the weather conditions?	6	0	6	1
2	What do you know about the culture/any famous cultural event?	7	0	5	4
3	What are the famous tourism spots?	3	2	2	1
4	What are the iconic buildings?	3	5	3	7
5	What is the currency?	4	0	7	0
6	What is the capital?	8	0	5	2
<b>Total Wrong Answers</b>		<b>32</b>	<b>7</b>	<b>28</b>	<b>15</b>
<b>Most Unfamiliar Destination Respondent Wise</b>		<b>5</b>	<b>0</b>	<b>3</b>	<b>0</b>

**Analysis**

SPSS 21 and Amos 24 were used to analyse the data through the structural equation model (SEM). The validity of measurement model was tested through convergent and discriminant validity. Convergent validity was tested through composite reliability (CR), factor loading, average variance extracted (AVE) and Cronbach's alpha. Factor loading and measurement model of all items is given in Table 4 & Figure 3. A total of two items were removed because of low factor loading (less than 0.5), and all remaining items had a factor loading of more than 0.5 (Hair et al., 2013).

**Table No. 3 Demographics of the respondents**

Items	n	%
<b>Gender</b>		
Male	42	19.4
Female	174	80.6
<b>Education</b>		
Bachelors	151	69.9
Masters	21	9.7
PhD	5	2.3
Others	39	18.1
<b>Age</b>		
16-20	36	16.7
21-25	146	67.6
26-30	28	13
31-35	6	2.8

**Table No. 4. Factor Loadings**

Items	Factor Loadings
<b>Information Quality</b>	
.... enable me to complete my travel with detailed information provided	.876
.... provides up-to-date information of the destination and the trip	.748
.... provides persuasive information of the destination and the trip	.697
.... provides accurate information of the destination and the trip	.764
<b>Source Credibility</b>	
.... providing the travel planning information and services is experienced	.753
.... providing the travel planning information and services is trustworthy	.827

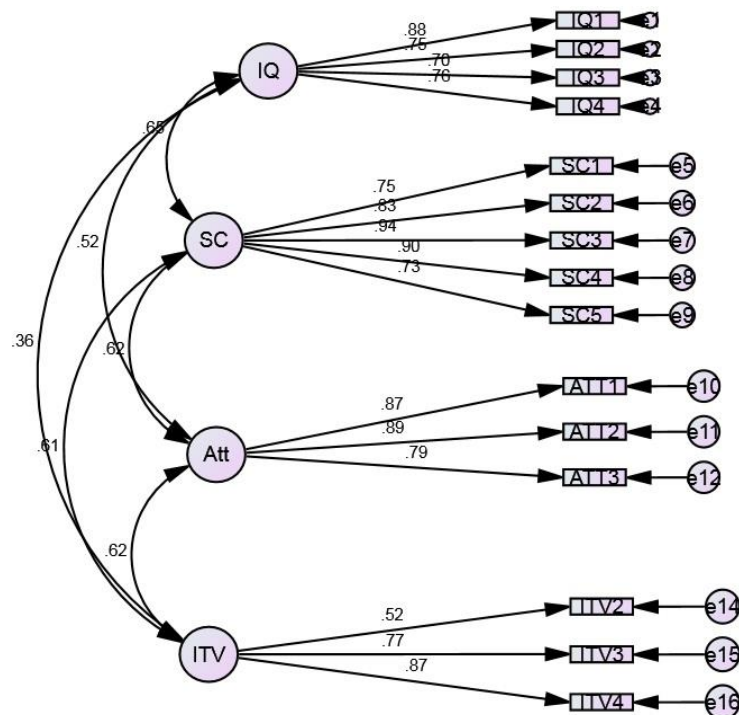
.... providing the travel planning information and services is reliable	.940
.... providing the travel planning information and services is well-known for its good credibility	.905
.... providing the travel planning information and services appears to be professional	.728
<b>Attitude towards Tourism Destination</b>	
.... is interesting to select a tourism destination	.873
.... is appealing to select a tourism destination	.894
.... is good idea to select a tourism destination	.786
<b>Intention to Visit</b>	
I intend to visit Australia in the near future	.521
I would choose Australia as the destination form my next holidays	.768
I would prefer to visit Australia as opposed to other similar destinations	.870

All of the items have composite reliability from 0.798 to 0.910, which is more than the threshold, and all AVEs are more than 0.5 (Fornell & Larcker, 1981; Bagozzi & Yi, 1988). All Cronbach's alpha values are between 0.790-0.912, which is good reliability (Taber, 2018). All values mentioned above show good convergent validity (see table 5).

**Table No. 5 Convergent & Discriminant Validity**

	Cronbach		AVE	MSV	MaxR(H)	Att	IQ	SC	ITV
	CR	alpha							
<b>Att</b>	0.905	.905	0.761	0.413	0.907	<b>0.872</b>			
<b>IQ</b>	0.886	.886	0.661	0.486	0.892	0.643	<b>0.813</b>		
<b>SC</b>	0.910	.912	0.671	0.486	0.921	0.563	0.697	<b>0.819</b>	
<b>ITV</b>	0.798	.790	0.577	0.314	0.849	0.495	0.387	0.560	<b>0.759</b>

The proposed hypotheses presented in the model were tested through SEM (Figure 4). The  $\chi^2$  was 429.972 with 249 degrees of freedom and the ratio of  $\chi^2$  to degrees of freedom below 1:3 (RMSEA= .041; CFI = 0.948; SRMR = .068; NFI=.908; PClose = .988), results shown that data fits according to the hypothesized model.

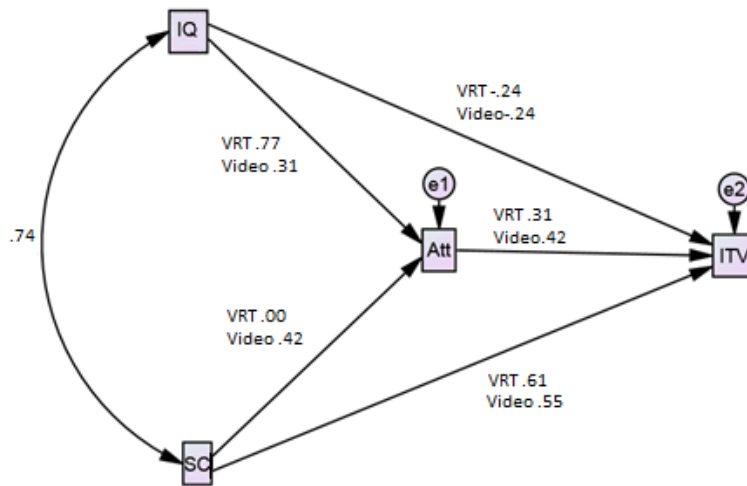


**Figure 3. Measurement Model**



**Table No. 6. Model Fit**

Measure	Estimate	Threshold	Interpretation
CMIN	429.972	--	--
DF	249	--	--
CMIN/DF	1.727	Between 1 and 3	Excellent
CFI	0.948	>0.95	Excellent
NFI	0.908	Between 0 and 1	Excellent
SRMR	0.068	<0.08	Excellent
RMSEA	0.041	<0.06	Excellent
PClose	0.988	>0.05	Excellent



**Figure 4. SEM**

**RESULTS**

Hypothesis 1 (H1) has been supported (Table 7) because of the highly significant p-value and beta value of VR compared to a video. Information quality (IQ) has a more positive influence on attitude towards tourism destination (ATT) among VR users than video users. H2 has been rejected because of the insignificant p-value of VR users, i.e., p=.991, compared to a highly significant p-value of video users. Source credibility (SC) does not have any influence on ATT among users of VR. H3 was presented as ATT has a positive influence on intention to visit, and results have rejected this hypothesis with the same high significant value of p<0.05 for video users. As proposed in H4 & H5 "information quality and source credibility have a direct impact on intention to visit" from the results it has been cleared that H4 is rejected, because of negative direct impact on intention to visit. On the other hand, H5 has been supported with a highly significant p-value and beta value of VR compared to a video.

A chi-square difference test was conducted to check model-level group differences. The result indicated no "invariance," meaning they differ at the model level (Table 8). Mediation was proposed in H6 & H7. Results (Table 9) indicate that ATT mediates the relationship between IQ and ITV in both VR and video. Contrary, ATT only mediates the relationship between SC and ITV in the video, and no mediation has been observed in VR. Therefore, H6 has been supported, and H7 is rejected.

**Table 7. Regression Weights**

		VR		Video	
		Beta	p-value	Beta	p-value
IQ → ATT		.77	***	.31	.004
SC → ATT		.00	.991	.42	***
ATT → ITV		.31	.007	.42	***
IQ → ITV		-.24	.088	-.24	.021
SC → ITV		.61	***	.55	***

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1



**Table No. 8. Chi-square difference test**

	<u>Chi-square</u>	<u>df</u>	<u>p-val</u>	<u>Invariant?</u>
<u>Overall Model</u>				
Unconstrained	8	2		
Fully constrained	20.5	6		
Number of groups		2		
Difference	12.5	4	0.014	No

**Table No. 9. Mediation Results**

<b>Path</b>	<b>Mode</b>	<b>Total Effect</b>	<b>P-Value</b>	<b>Indirect Effect</b>	<b>P-Value</b>	<b>Mediation</b>
IQ→ATT→ITV	<b>VR</b>	.768	.001	.238	.006	Yes
	<b>Video</b>	.308	.013	.130	.008	Yes
SC→ATT→ITV	<b>VR</b>	.768	.001	.000	.960	No
	<b>Video</b>	.308	.013	.178	.008	Yes

Bootstrapping sample 2000

## DISCUSSION AND CONCLUSION

### Summary of main findings

This study investigates the relationship between virtual reality and decision-making in selecting a tourism destination. Virtual reality has great potential to be considered as one of the most effective modes of communication for selecting a destination. Because VR through its 360-degree view provides an actual idea about a destination where a viewer can focus on one spot by moving towards it. It is one way of having visual information about the destination, which can help a tourist in decision-making. The current study has utilised ELM and TPB by comparing VR with video to study attitudinal change and intention to visit tourism destination. The results of VR revealed that information quality – a central route – plays a significant role in forming the attitude towards tourism destination. But source credibility – the peripheral route – has an insignificant impact in attitude formation. This result supports the prior studies that attitudinal change or informational social influence is affected by the central route instead of the peripheral route (Li, 2013; Wang, 2015). As travelling is a costly and time-consuming activity, travellers take more time in information acquisition to minimise the risk after purchasing the tour (Tan & Chen, 2012). It has been observed that attitudinal change and intention to visit are influenced through the central route, so it can be concluded that behavioural intention is long-lasting, resistant and predictive of behaviour through VR.

The video results concluded that information quality and source credibility significantly impact attitude towards tourism destination. This result is in line with the past study that central route and peripheral route can influence attitude together (SanJosé-Cabezudo et al., 2009). But the beta value of video is very low compared to VR, showing that VR is a better mode of communication for attitudinal change. This study also concluded that intention to visit is positively influenced by attitude towards tourism destination, which is in line with past research (Molinillo et al., 2018). Information quality through the direct path negatively influences an intention to visit due to a strong mediating role of attitude towards a destination in both VR and video. So it may be further argued that attitudinal change/formation must take place before the creation of behavioural intention (Ajzen, 1991). Contrary, VR and video are directly influencing intention to visit through source credibility. Consumers have shown more trust in VR than video for directly influencing an intention to visit.

### Theoretical and practical contributions

The major theoretical contribution of this research is to study consumer behaviour and decision-making with respect to VR. Virtual reality induces the cognitive decision-making of a consumer. The second theoretical contribution is to test the integrative model (ELM & TPB) with VR, as Sussman and Siegal (2003) recommended to study integrative models with technologies and their adoption processes. Another theoretical contribution is to study the comparison of VR and video with ELM. As discussed earlier, technology and tourism marketing tactics are advancing rapidly in this era, so marketers need to implement new strategies and tools with continuous improvement processes to survive in competitive scenarios. It is also evident from this research that VR is creating a more

positive impact on attitudinal change than video. This research provides insight to marketers for focusing on the information aspect of VR implementation as a marketing tool. As the viewer mainly focuses on the information content, destination details and tour planning while deciding on the destination. Therefore, marketers must recognise the importance of information in developing a VR.

### Limitations and future research

This study is one of its kind to investigate cognitive or emotion-based decision-making with VR. Therefore, this research has several limitations and future recommendations. The data has been collected from one city about a single tourism destination (Australia); future studies may collect data from more than one city for multiple destinations. The basic model of elaboration likelihood has been used in this research; future research may also consider several other variables with ELM. Furthermore, cross-cultural decision-making can be investigated in the future.

### REFERENCES

- Ajzen, I. (1991) 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes*, 50(2), pp. 179–211. doi: 10.1016/0749-5978(91)90020-T.
- Angst, C. and Agarwal, R. (2009) 'Adoption of electronic health records in the presence of privacy concerns: the elaboration likelihood model and individual persuasion', *MIS Quarterly*, 33(2), pp. 339–370. Available at: <https://dl.acm.org/citation.cfm?id=2017430> (Accessed: 29 October 2018).
- Aziz, A. and Zainol, N. A. (2011) 'Destination image: an overview and summary of selected research (1974–2008)', *International Journal of Leisure and Tourism Marketing*, 2(1), p. 39. doi: 10.1504/IJLTM.2011.037185.
- Bagozzi, R. P. and Yi, Y. (1988) 'On the evaluation of structural equation models', *Journal of the Academy of Marketing Science*, 16(1), pp. 74–94. doi: 10.1007/BF02723327.
- Bamberg, S., Ajzen, I. and Schmidt, P. (2003) 'Choice of Travel Mode in the Theory of Planned Behavior: The Roles of Past Behavior, Habit, and Reasoned Action', *Basic and Applied Social Psychology*, 25(3), pp. 175–187. doi: 10.1207/S15324834BASP2503\_01.
- Beck, M. and Crié, D. (2018) 'I virtually try it ... I want it! Virtual Fitting Room: A tool to increase online and off-line exploratory behavior, patronage and purchase intentions', *Journal of Retailing and Consumer Services*, 40, pp. 279–286. doi: 10.1016/J.JRETCONSER.2016.08.006.
- Bhattacharjee and Sanford (2006) 'Influence Processes for Information Technology Acceptance: An Elaboration Likelihood Model', *MIS Quarterly*, 30(4), p. 805. doi: 10.2307/25148755.
- Bitner, M. J., & Obermiller, C. (1985) 'The elaboration likelihood model: limitations and extensions in marketing', *Advances in Consumer Research*, 12(1), pp. 420–425. doi: 10.1017/CBO9781107415324.004.
- Boyd, E. and Koles, B. (2018) *Call for Papers | Journal of Business Research Special Issue: Virtual Reality in Marketing: Emerging Opportunities in Research and Practice*, Elsevier.
- Castro, J. C. et al. (2017) 'Virtual Reality on e-Tourism', in *IT Convergence and Security*. Springer, Singapore, pp. 86–97. doi: 10.1007/978-981-10-6454-8\_13.
- Chen, S.-H. and Lee, K.-P. (2008) 'The Role of Personality Traits and Perceived Values in Persuasion: an Elaboration Likelihood Model Perspective on Online Shopping', *Social Behavior and Personality: an international journal*, 36(10), pp. 1379–1399. doi: 10.2224/sbp.2008.36.10.1379.
- Chew, E. Y. T. and Jahari, S. A. (2014) 'Destination image as a mediator between perceived risks and revisit intention: A case of post-disaster Japan', *Tourism Management*, 40, pp. 382–393. doi: 10.1016/j.tourman.2013.07.008.
- Chong, A. Y. L. et al. (2017) 'Analysing key influences of tourists' acceptance of online reviews in travel decisions', *Internet Research*, 28(3), pp. 564–586. doi: 10.1108/IntR-05-2017-0212.
- Cranmer, E. E., tom Dieck, M. C. and Jung, T. (2018) 'How can Tourist Attractions Profit from Augmented Reality?', in *Augmented Reality & Virtual Reality*. Springer, pp. 21–32. doi: 10.1007/978-3-319-64027-3\_2.
- Dupas, P. (2014) 'Short-Run Subsidies and Long-Run Adoption of New Health Products: Evidence From a Field Experiment', *Econometrica*, 82(1), pp. 197–228. doi: 10.3982/ECTA9508.
- eMarketer (2015) *Virtual Reality Interest Highest Among Gen Z*. Available at:

- <https://www.emarketer.com/Article/Virtual-Reality-Interest-Highest-Among-Gen-Z/1013295> (Accessed: 18 June 2018).
- Farah, M. F., Ramadan, Z. B. and Harb, D. H. (2019) 'The examination of virtual reality at the intersection of consumer experience, shopping journey and physical retailing', *Journal of Retailing and Consumer Services*, 48, pp. 136–143. doi: 10.1016/J.JRETCONSER.2019.02.016.
- Fauzi, A. H. and Gozali, A. A. (2015) 'Virtual Reality to Promote Tourism in Indonesia', *Jurnal Sistem Komputer*, 5(2), pp. 47–50. doi: 10.14710/JSK.V5I2.86.
- Filieri, R. and McLeay, F. (2014) 'E-WOM and Accommodation', *Journal of Travel Research*, 53(1), pp. 44–57. doi: 10.1177/0047287513481274.
- Fisher, E., González, Y. S. and Tena, A. la C. M. (2019) 'Bringing the Virtual to Reality- How Virtual Reality Can Enhance People's Health and Social Lives', *Neurol Res Surg*, 2(1), pp. 1–10. Available at: [www.empireonline.com](http://www.empireonline.com) (Accessed: 15 May 2019).
- Flynn, B. S. *et al.* (2011) 'Evaluation of smoking prevention television messages based on the elaboration likelihood model', *Health Education Research*, 26(6), pp. 976–987. doi: 10.1093/her/cyr082.
- Fogg, B. J. (2002) *Persuasive technology: using computers to change what we think and do*. Morgan Kaufmann Publishers. Available at: [https://books.google.com.pk/books/about/Persuasive\\_Technology.html?id=gfiYh\\_BHj94C&source=kp\\_book\\_description&redir\\_esc=y](https://books.google.com.pk/books/about/Persuasive_Technology.html?id=gfiYh_BHj94C&source=kp_book_description&redir_esc=y) (Accessed: 28 January 2019).
- Fornell, C. and Larcker, D. F. (1981) 'Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics', *Journal of Marketing Research*, 18(3), pp. 382–388. doi: 10.1177/002224378101800313.
- Forret, M. L. and Turban, D. B. (1996) 'Implications of the Elaboration Likelihood Model for interviewer decision processes', *Journal of Business and Psychology*, 10(4), pp. 415–428. doi: 10.1007/BF02251778.
- Franco-Valdez, A. D., Valdez Cervantes, A. and Motyka, S. (2018) 'Beauty is truth: The effects of inflated product claims and website interactivity on evaluations of retailers' websites', *Journal of Business Research*, 90, pp. 67–74. doi: 10.1016/J.JBUSRES.2018.04.027.
- Fransen, M. L. *et al.* (2015) 'A typology of consumer strategies for resisting advertising, and a review of mechanisms for countering them', *International Journal of Advertising*, 34(1), pp. 6–16. doi: 10.1080/02650487.2014.995284.
- Gibson, A. and O'Rawe, M. (2018) 'Virtual Reality as a Travel Promotional Tool: Insights from a Consumer Travel Fair', in *Augmented Reality and Virtual Reality*. Springer, Cham, pp. 93–107. doi: 10.1007/978-3-319-64027-3\_7.
- Giné, X. and Yang, D. (2009) 'Insurance, credit, and technology adoption: Field experimental evidence from Malawi', *Journal of Development Economics*, 89(1), pp. 1–11. doi: 10.1016/J.JDEVCO.2008.09.007.
- Griffin, T. *et al.* (2017) 'Virtual Reality and Implications for Destination Marketing', *Travel and Tourism Research Association: Advancing Tourism Research Globally*. Available at: [https://scholarworks.umass.edu/ttra/2017/Academic\\_Papers\\_Oral/29](https://scholarworks.umass.edu/ttra/2017/Academic_Papers_Oral/29) (Accessed: 18 November 2018).
- Griffith, E. E., Nolder, C. J. and Petty, R. E. (2018) 'The Elaboration Likelihood Model: A Meta-Theory for Synthesizing Auditor Judgment and Decision-Making Research', *AUDITING: A Journal of Practice & Theory*, 37(4). doi: 10.2308/ajpt-52018.
- Gu, J. *et al.* (2017) 'Privacy concerns for mobile app download: An elaboration likelihood model perspective', *Decision Support Systems*, 94, pp. 19–28. doi: 10.1016/J.DSS.2016.10.002.
- Guttentag, D. A. (2010) 'Virtual reality: Applications and implications for tourism', *Tourism Management*, 31(5), pp. 637–651. doi: 10.1016/j.tourman.2009.07.003.
- Hair, J. F. *et al.* (2013) *Multivariate data analysis*. Pearson Education Limited.
- Halvorson, W., Ewing, M. and Windisch, L. (2011) 'Using Second Life to Teach About Marketing in Second Life', *Journal of Marketing Education*, 33(2), pp. 217–228. doi: 10.1177/0273475311410854.
- Herberich, D. H., List, J. A. and Price, M. K. (no date) 'How Many Economists does it take to Change a Light Bulb? A Natural Field Experiment on Technology Adoption'. Available at:

- [http://web.stanford.edu/group/peec/cgi-bin/docs/events/2010/becc/presentations/1E\\_DavidHerberich.pdf](http://web.stanford.edu/group/peec/cgi-bin/docs/events/2010/becc/presentations/1E_DavidHerberich.pdf) (Accessed: 25 June 2018).
- Ho, S. Y. and Bodoff, D. (2017) 'The Effects of Web Personalisation on User Attitude and Behavior: An Integration of the Elaboration Likelihood Model and Consumer Search Theory', *MIS Quarterly*, 38(2), pp. 497–520. doi: 10.25300/misq/2014/38.2.08.
- Hong, J. (2019) 'Medical Augmented Reality and Virtual Reality', *Journal of the Korean Society of Radiology*, 80(2), p. 226. doi: 10.3348/jksr.2019.80.2.226.
- Huang, K.-T. *et al.* (2019) 'Augmented Versus Virtual Reality in Education: An Exploratory Study Examining Science Knowledge Retention When Using Augmented Reality/Virtual Reality Mobile Applications', *Cyberpsychology, Behavior, and Social Networking*, 22(2), pp. 105–110. doi: 10.1089/cyber.2018.0150.
- Huang, S. and Hsu, C. H. C. (2009) 'Effects of Travel Motivation, Past Experience, Perceived Constraint, and Attitude on Revisit Intention', *Journal of Travel Research*, 48(1), pp. 29–44. doi: 10.1177/0047287508328793.
- Jun, S. H. and Vogt, C. (2013) 'Travel information processing applying a dual-process model', *Annals of Tourism Research*, 40, pp. 191–212. doi: 10.1016/J.ANNALS.2012.09.001.
- Kaplan, A. M. and Haenlein, M. (2009) 'The fairyland of Second Life: Virtual social worlds and how to use them', *Business Horizons*, 52(6), pp. 563–572. doi: 10.1016/j.bushor.2009.07.002.
- Kerr, G. *et al.* (2015) 'Does traditional advertising theory apply to the digital world? A replication analysis questions the relevance of the elaboration likelihood model', *Journal of Advertising Research*, 55(4), pp. 390–400. doi: 10.2501/JAR-2015-001.
- Kim and Wang, D. (2018) *Journal of Travel & Tourism Marketing | Special Issue Call for Papers | Future of Tourism Marketing, Journal of Travel & Tourism Marketing*.
- Kwak, D.-H. (Austin) *et al.* (2018) 'The moderating role of helper's high in anchoring process: An empirical investigation in the context of charity website design', *Computers in Human Behavior*, 84, pp. 230–244. doi: 10.1016/J.CHB.2018.02.024.
- Lam, S. Y., Ho-ying Fu, J. and Li, D. (2017) 'The influence of thematic product displays on consumers: An elaboration-based account', *Psychology & Marketing*, 34(9), pp. 868–883. doi: 10.1002/mar.21028.
- Leong, L. Y. *et al.* (2019) 'Do Electronic Word-of-Mouth and Elaboration Likelihood Model Influence Hotel Booking?', *Journal of Computer Information Systems*, 59(2), pp. 146–160. doi: 10.1080/08874417.2017.1320953.
- Li, C.-Y. (2013) 'Persuasive messages on information system acceptance: A theoretical extension of elaboration likelihood model and social influence theory', *Computers in Human Behavior*, 29(1), pp. 264–275. doi: 10.1016/j.chb.2012.09.003.
- Lombart, C. *et al.* (2019) 'Consumer perceptions and purchase behavior toward imperfect fruits and vegetables in an immersive virtual reality grocery store', *Journal of Retailing and Consumer Services*, 48, pp. 28–40. doi: 10.1016/J.JRETCONSER.2019.01.010.
- MacDonald, E., Milfont, T. and Gavin, M. (2016) 'Applying the Elaboration Likelihood Model to increase recall of conservation messages and elaboration by zoo visitors', *Journal of Sustainable Tourism*, 24(6), pp. 866–881. doi: 10.1080/09669582.2015.1091464.
- MacQuarrie, A. and Steed, A. (2017) 'Cinematic virtual reality: Evaluating the effect of display type on the viewing experience for panoramic video', in *2017 IEEE Virtual Reality (VR)*. IEEE, pp. 45–54. doi: 10.1109/VR.2017.7892230.
- Marasco, A. *et al.* (2018) 'Exploring the role of next-generation virtual technologies in destination marketing', *Journal of Destination Marketing and Management*, 9, pp. 138–48. doi: 10.1016/j.jdmm.2017.12.002.
- Molinillo, S. *et al.* (2018) 'DMO online platforms: Image and intention to visit', *Tourism Management*, 65, pp. 116–130. doi: 10.1016/J.TOURMAN.2017.09.021.
- Moyer-Guse, E. and Nabi, R. L. (2010) 'Explaining the Effects of Narrative in an Entertainment Television Program: Overcoming Resistance to Persuasion', *Human Communication Research*, 36(1), pp. 26–52. doi: 10.1111/j.1468-2958.2009.01367.x.
- Oinas-Kukkonen, H. and Harjumaa, M. (2009) 'Persuasive Systems Design: Key Issues, Process Model, and System Features', *Communications of the Association for Information Systems*, 24, pp. 485–500. doi: 10.17705/1CAIS.02428.

- Papagiannidis, S., See-To, E. and Bourlakis, M. (2014) 'Virtual test-driving: The impact of simulated products on purchase intention', *Journal of Retailing and Consumer Services*, 21(5), pp. 877–887. doi: 10.1016/J.JRETCONSER.2014.02.010.
- Petty, R. E. and Cacioppo, J. T. (1977) 'Forewarning , Cognitive Responding , and Resistance to Persuasion', 35(9), pp. 645–655.
- Petty, R. E. and Cacioppo, J. T. (1986) 'The Elaboration Likelihood Model of Persuasion', in *Communication and Persuasion*. New York, NY: Springer New York, pp. 1–24. doi: 10.1007/978-1-4612-4964-1\_1.
- Petty, R. E., Cacioppo, J. T. and Goldman, R. (1981) 'Personal involvement as a determinant of argument-based persuasion.', *Journal of Personality and Social Psychology*, 41(5), pp. 847–855. doi: 10.1037/0022-3514.41.5.847.
- Phillips, W. J., Asperin, A. and Wolfe, K. (2013) 'Investigating the effect of country image and subjective knowledge on attitudes and behaviors: U.S. Upper Midwesterners' intentions to consume Korean Food and visit Korea', *International Journal of Hospitality Management*, 32, pp. 49–58. doi: 10.1016/J.IJHM.2012.04.003.
- Portman, M. E., Natapov, A. and Fisher-Gewirtzman, D. (2015) 'To go where no man has gone before: Virtual reality in architecture, landscape architecture and environmental planning', *Computers, Environment and Urban Systems*, 54, pp. 376–384. doi: 10.1016/J.COMPENVURBSYS.2015.05.001.
- Rauschnabel, P.A., Felix, R., Hinsch, C., Shahab, H. and Alt, F. (2022). What is XR? Towards a framework for augmented and virtual reality, *Computers in Human Behavior*, 133, p.107289.
- SanJosé-Cabezudo, R., Gutiérrez-Arranz, A. M. and Gutiérrez-Cillán, J. (2009) 'The Combined Influence of Central and Peripheral Routes in the Online Persuasion Process', *CyberPsychology & Behavior*, 12(3), pp. 299–308. doi: 10.1089/cpb.2008.0188.
- Shahab, M. H., Ghazali, E. and Mohtar, M. (2021) 'The role of elaboration likelihood model in consumer behaviour research and its extension to new technologies: A review and future research agenda', *International Journal of Consumer Studies*, 45(4), pp. 664–689. doi: 10.1111/ijcs.12658.
- Shahab, H., Mohtar, M., Ghazali, E., Rauschnabel, P. A. & Geipel, A (2022a) Virtual Reality in Museums: Does It Promote Visitor Enjoyment and Learning?, *International Journal of Human-Computer Interaction*, DOI: 10.1080/10447318.2022.2099399
- Shahab, H., Ghazali, E. M., & Mohtar, M. (2022b). A Systematic Literature Review and Future Research Agenda for the Gratification Discrepancies Approach. *Contemporary Management Research*, 18(1), 1-33. <https://doi.org/10.7903/cmr.21583>
- Shimp, T. A. (1981) 'Attitude toward the AD as a Mediator of Consumer Brand Choice', *Journal of Advertising*, 10(2), pp. 9–48. doi: 10.1080/00913367.1981.10672756.
- Shu, M. (Lavender) and Scott, N. (2014) 'Influence of Social Media on Chinese Students' Choice of an Overseas Study Destination: An Information Adoption Model Perspective', *Journal of Travel & Tourism Marketing*, 31(2), pp. 286–302. doi: 10.1080/10548408.2014.873318.
- Simons, H., Morreale, J. and Gronbeck, B. (2001) *Persuasion in Society*. Sage Publications. Available at: [https://www.corwin.com/sites/default/files/upm-binaries/2741\\_SimonsMarketingSampler.pdf](https://www.corwin.com/sites/default/files/upm-binaries/2741_SimonsMarketingSampler.pdf) (Accessed: 28 January 2019).
- Sparks, B. A., Perkins, H. E. and Buckley, R. (2013) 'Online travel reviews as persuasive communication: The effects of content type, source, and certification logos on consumer behavior', *Tourism Management*, 39, pp. 1–9. doi: 10.1016/j.tourman.2013.03.007.
- Sussman, S. W. and Siegal, W. S. (2003) 'Informational influence in organisations: An integrated approach to knowledge adoption', *Information Systems Research*, 14(1), pp. 47–65. doi: 10.1287/isre.14.1.47.14767.
- Taber, K. S. (2018) 'The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education', *Research in Science Education*, 48(6), pp. 1273–1296. doi: 10.1007/s11165-016-9602-2.
- Tan, W.-K. and Chen, T.-H. (2012) 'The usage of online tourist information sources in tourist information search: an exploratory study', *The Service Industries Journal*, 32(3), pp. 451–476. doi: 10.1080/02642069.2010.529130.
- Te'eni, D. (2012) 'What's communication got to do with IT?', *European Journal of Information*

- Systems*, 21(4), pp. 341–344. doi: 10.1057/ejis.2012.34.
- Teng, S., Khong, K. W. and Goh, W. W. (2014) ‘Conceptualising Persuasive Messages Using ELM in Social Media’, *Journal of Internet Commerce*, 13(1), pp. 65–87. doi: 10.1080/15332861.2014.910729.
- Verweij, M. *et al.* (2015) ‘Emotion, rationality, and decision-making: how to link affective and social neuroscience with social theory’, *Frontiers in Neuroscience*, 9, p. 332. doi: 10.3389/fnins.2015.00332.
- Vitaliev, V. (2016) ‘VR around the... world’, *Engineering & Technology*, 11(3), pp. 33–33. doi: 10.1049/et.2016.0312.
- Walters, G., Sparks, B. and Herington, C. (2007) ‘The Effectiveness of Print Advertising Stimuli in Evoking Elaborate Consumption Visions for Potential Travelers’. doi: 10.1177/0047287507302376.
- Wang, P. (2015) ‘Exploring the influence of electronic word-of-mouth on tourists’ visit intention’, *Journal of Systems and Information Technology*, 17(4), pp. 381–395. doi: 10.1108/JSIT-04-2015-0027.
- Wang, P. *et al.* (2018) ‘A Critical Review of the Use of Virtual Reality in Construction Engineering Education and Training’, *International Journal of Environmental Research and Public Health*, 15(6), p. 1204. doi: 10.3390/ijerph15061204.
- Yaoyuneyong, G. S. *et al.* (2018) ‘Virtual dressing room media, buying intention and mediation’, *Journal of Research in Interactive Marketing*, 12(1), pp. 125–144. doi: 10.1108/JRIM-06-2017-0042.
- Yoo, C. W. *et al.* (2017) ‘Improving travel decision support satisfaction with smart tourism technologies: A framework of tourist elaboration likelihood and self-efficacy’, *Technological Forecasting and Social Change*, 123, pp. 330–341. doi: 10.1016/J.TECHFORE.2016.10.071.