Exploring the Mechanism of Destination Brand Engagement in the Augmented Reality Advertising

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Keywords	Abstract
AR, AR advertising, Destination brand engagement	Augmented reality advertising (ARA), has become a new type of advertising. A review of the literature indicates a lack of insights into the mechanisms of how ARA can benefit the consumer-brand relationship. More specifically, this study based on the Cognitive-Affective-Conation (CAC) model to propose a theoretical framework regarding AR characteristics (perceived interactivity and perceived augmentation quality) and ARA characteristics (perceived informativeness, perceived entertainment, and perceived credibility) influence AR attitude and ARA attitude, respectively, which in turn influences destination brand engagement. A self-administered online survey was conducted. 159 students were collected by experiencing a printed tourism AR-based AD. The results of PLS-SEM analysis showed that perceived interactivity and perceived augmentation quality positively affect AR attitude. In contrast, only entertainment and perceived credibility positively affect ARA's attitude. Furthermore, only ARA attitude has been found to positively affect destination brand engagement. This study's findings can assist managers in realizing how to use ARA to trigger consumer engagement toward destination brands.

1. Research background

Augmented reality advertising (hereafter, ARA), incorporates AR technology, enables individuals to engage with advertising, and gradually becomes a novel marketing technique (Tankovska, 2020). Although the spending of ARA only shares 0.47 percent of global advertising spend (AR Insider, 2023), the ARA market worldwide is projected to have a market volume of US$6.9bn by 2027 (Statista, 2023).

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Under this trend, studies have started to investigate ARA-related issues, such as ARA effectiveness (e.g., Feng & Xie, 2018; Sung, 2021; Urbie et al., 2022), attitude toward AR advertising (Fang, 2024), compare ARA, traditional advertising, and QR code advertising (Yaoyuneyong et al., 2016), and how ARA affect behavior intention (Saleem et al., 2022; Lin et al., 2024). As AR-related literature showed that AR triggers brand engagement (e.g., Diaa, 2022; McLean & Wilson, 2019), only a few studies have highlighted the factors that drive advertising engagement or brand engagement, such as narrative advertising format (Tsou & Rodgers, 2024), virtual brand experience (Lee & Cho, 2023) and escapism experience (Sung et al., 2022) in the ARA field. The mechanism of how ARA can benefit the consumer-brand relationship (i.e., brand engagement) is still unclear and at an infant stage. Moreover, as augmented reality marketing (ARM) becomes a strategic trend in the tourism and hospitality industry (Dadwal & Hassan, 2016; Jiang et al., 2023), individuals who plan to travel to the next destination can pre-experience advertising that is integrated with AR technology. Since destination brand engagement has become an important issue (Chen et al., 2020) and has redefined traveler behavior since the COVID-19 pandemic (Kumar, Panda, & Adhikari, 2023), how ARA drives destination brand engagement remains unknown and needs further empirical investigation.

To address the gap mentioned above, this study conceptualizes and empirically tests how ARA stimulates destination brand engagement by affecting their affective states. More specifically, based on the Cognitive-Affective-Conation (CAC) framework, this study follows AR advertising studies (Feng & Xie, 2018; Saleem et al., 2022; Uribe et al., 2022) and AR applications literature from a variety of contexts (e.g., Kumar, 2022; McLean, 2019), to examine how AR characteristics (interactivity, augmentation quality) and ARA characteristics (perceived informativeness, perceived entertainment, and perceived credibility) affect consumer affective states (i.e., AR attitude and ARA attitude), and eventually affects consumer response formulation, that is, destination brand engagement.

2. Theoretical background and hypotheses development

2.1 Cognitive-Affective-Conation (C-A-C) framework

This study adopted the cognition-affect-conation (hereafter, C-A-C) paradigm framework as the fundamental theoretical basis to explore the underlying mechanisms of destination brand engagement within augmented reality advertising (ARA). This is because of the following reasons. First, C-A-C provides a multi-layer perspective for translating an individual's perception and affect into the response. Second, C-A-C is not only empirically validated in a variety of contexts (see Qin, Osatuyi, & Xu's 2021 review), but can further integrate the latest technology characteristics to explain well how an individual transfers their perception of the technology into response, such as AR (Qin et al., 2021; Ibrahim et al., 2023). As Javornik (2016) indicated, consumers have affective, cognitive, and behavioral responses toward AR characteristics or applications, so it is reasonable to understand the sequential linkage of cognition, affect, and conation further. Moreover, the C-A-C framework has also been applied in communication-related literature (e.g., Zeng et al., 2023), as AR advertising is a kind of communication form, which makes it appropriate and able to address how consumers respond toward AR advertising.

Building upon the C-A-C framework, this study investigated how consumers respond to AR advertising involving destination brand engagement. More specifically, this framework provides a comprehensive understanding of destination brand engagement formation, which includes three elements: cognition (AR features and ARA characteristics), affect (AR attitude and ARA attitude), and conation (destination brand engagement).

2.2 The relationship between AR features and AR attitude

For the relationship between AR features on AR attitude - perceived interactivity and augmentation quality were introduced, both are recognized as significant media characteristics or features in the AR context (Javornik, 2016; Kumar, 2022; Park & Yoo, 2020; Yim et al., 2017).

Consistent with a prior study (Park, & Yoo, 2020), this study defined perceived interactivity as "a psychological state experienced by a site visitor during the interaction processes" (p.2). Augmentation quality is the extent to which an individual perceives the augmented content as realistic (Rauschnabel et al., 2019).

In a meta-analysis study, Fan, Jiang, & Deng (2022) proposed that the sense of presence (interactivity and vividness) in the AR tourism experience can positively enhance the customer's psychological response (such as attitude). In other words, the AR features have directly and positively affected customer attitude. The relationship between AR feature-perceived interactivity and the attitude toward AR-related objectives is found in recent AR-related studies. In their study, Park & Yoo (2020) investigated user-to-AR interactivity, which includes playfulness and controllability that influence users' attitudes toward a product through mental imagery. Arghashi & Yuksel's (2022) study also found that a higher degree of interactivity with AR translates to a higher degree of attitude toward AR apps.

In the context of AR in online retailing, Kumar (2022) proposed that AR characteristics (such as perceived augmentation quality) act as antecedents to create a variety of AR-derived experiences that lead to several positive and negative values. These ultimately shape individuals' attitudes toward AR and the brand. Surprisingly, studies found that the relationship between perceived augmentation quality and attitude toward AR objectives is inconsistent.

In the AR-apps study, Rauschnabel et al. (2019) proposed that perceived augmentation quality leads to an improved attitude toward mobile AR apps but failed to find evidence to prove it. By investigating museum visitor behaviors, Wu, Lin, Peng, & Liu (2023) indicated the positive relationship between perceived augmentation quality and attitude toward the AR app but found it was not the key factor enhancing the participants' attitudes toward the AR app. To understand tourists' future intentions toward their desired destination, Ahmad et al. (2023) found augmentation quality plays an important role in influencing AR attitude.

All of the above discussions lead to expect that in the current ARA context:

H1: Perceived interactivity positively affects AR attitude.

H2: Augmentation quality positively affects AR attitude.

2.3 The relationship between Advertising features and ARA attitude

This study investigated perceived informativeness, perceived entertainment, and perceived credibility as antecedents of ARA attitude because perceived informativeness and perceived entertainment are derived from Ducoffe's (1995) advertising model for justifying how consumers evaluate the value of advertising. Perceived credibility was added by Brackett and Carr (2001) that dominant consumer attitudes and facilitates consumers' acceptance of advertising. In addition, in the AR advertising field, perceived informativeness, perceived entertainment, and perceived credibility have also been recognized as three essential elements to capture consumers' attention and enhance their evaluation of AR advertising (e.g., Yaoyuneyong et al., 2016; Feng & Xie, 2018; Saleem et al., 2022; Uribe et al., 2022).

Following previous studies, perceived informativeness reflects consumers' subjective assessment of how much information the product presentation provides (Smink et al. 2019). According to Martins et al (2019), perceived entertainment is "the ability of an advertisement to promote enjoyment by providing a form of escapism, diversion, aesthetic enjoyment, or emotional release" (p.380). Perceived credibility of advertising is defined as the extent to which consumers perceive that the information claims in an advertisement is truthful and believable (Martins et al., 2019).

Previous advertising-related literature has found a relationship between perceived informativeness and attitude toward advertising (e.g., Lee & Hong, 2016; Feng & Xie, 2018; Martins et al., 2019). In the ARA context, digital reality advertising (such as ARA, augmented reality hypermedia, ARH) lets consumers access brand information not only receive higher advertising scores (Yaoyuneyong et al., 2016) but also leads to positive advertising attitude (Lee & Cho, 2023.) Saleem et al. (2022) found that the informativeness of AR advertising enhances advertising value. In their study, Uribe et al. (2022) also found that ARA conveys more informativeness and helps individuals generate positive ad evaluations and form better attitudes toward ARA. Therefore, this study examines the effect of perceived informativeness on attitudes toward AR advertising.

The prominent impact of perceived entertainment on attitude toward advertising has been found in a variety of advertising contexts, such as digital advertising (Sharma et al., 2022). Studies in the AR advertising context argued that compared with traditional advertising, digital reality advertising (such as ARA, augmented reality hypermedia, ARH) seems more attractive and shows a higher level of entertainment (Yaoyuneyong et al.,2016; Saleem et al., 2022) and generates better advertising attitudes than traditional advertising (Uribe et al., 2022). Accordingly, when consumers perceive entertainment with AR advertising, they are more likely to generate positive attitudes toward AR advertising.

Empirical evidence suggests that perceived credibility benefits advertising value (Adeline et al., 2023) and evokes a positive association or effect toward attitude advertising (Jiang et al., 2022). In the AR advertising context, only Jayawardena et al. (2023) have proposed a conceptual framework indicating that source credibility in AR advertising may influence consumer attitude change toward AR advertising. Accordingly, it is plausible that the perceived credibility of AR advertising positively affects attitudes toward AR advertising.

Taken together, this study proposed that in the current ARA context:

H3: Perceived informativeness positively affects AR advertising attitude.

H4: Perceived entertainment positively affects AR advertising attitude.

H5: Perceived credibility positively affects AR advertising attitude.

2.4 The relationship between AR attitude and ARA attitude on Destination Brand Engagement

According to Kladou et al. (2017), destination or place brand elements such as the name, tagline, and logo as identifiers for leaving impressions, mirroring images of others and reflecting embedded identity (see p.429), which implies those who choose a specific destination brand for forming or expressing their self-concept or identity different from others (Sprott et al., 2009). In their study, Chen et al. (2020) also argued that destination brand self-congruence strengthens destination brand engagement. Therefore, this study followed Sprott et al. (2009), and defined destination brand engagement as "a generalized tendency to include destination brands as a part of the self-concept".

Findings in AR-related studies have found controversial results of AR attitude on engagement. Arghashi & Yuk (2022) found that attitude toward AR apps positively affects consumer engagement. Findings from Rauschnabel et al. (2019) showed customers' AR attitudes fail to reflect on brand-related responses. Sung et al. (2022) argued that the unique experience of AR (such as escapism) triggers an individual's brand engagement. Taken together, although the relationship between AR attitude and brand engagement is not well-investigated, it is plausible that as individuals exposed to the specific "destination brand" AR advertising, the unique experience may transfer to a positive attitude toward AR and lead to positive destination brand engagement in consequence.

However, studies that examine the direct impact of attitude toward advertising on destination brand engagement are scant within the AR advertising-related literature. Yet, some studies in the advertising field show a positive relationship between attitude toward advertising and variety engagement. For example, Yin et al. (2023) found that consumers' attitude toward skippable advertising leads to more resilient engagement (such as avoidance). In the AR context, Dodoo and Youn (2021) found that attitude toward the Snapchat AR ad lens resulted in continuous engagement with the AR ad lens. Based on these findings, it seems logical to expect that when consumers have a positive attitude toward AR advertising, they may find a connection with the advertising content that influences destination brand engagement with which they interact.

Taken together, the relationship between attitude toward AR or ARA on destination brand engagement is not clear; therefore, this study expects that in the current ARA context:

H6: AR attitude positively affects destination brand engagement.

H7: AR advertising attitude positively affects destination brand engagement.

Based on the literature review and the proposed hypotheses, this study graphed the conceptual framework in Figure 1.
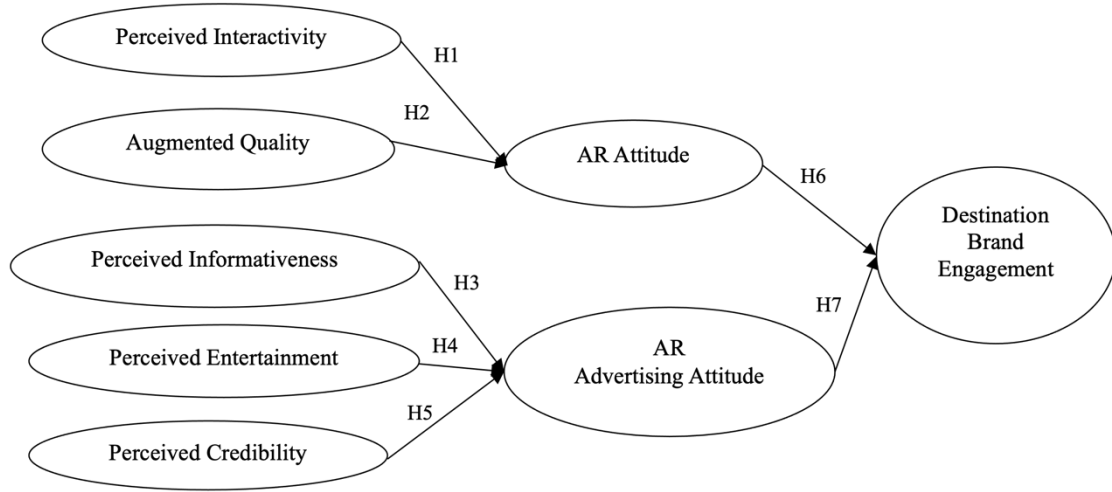
Fig.1 *Conceptual Framework of This Study*

3. Method

3.1 Measurements

This study developed a self-administered survey consisting of 27 measurement items. Perceived interactivity was adjusted to four items developed by Yim et al. (2017). Augmentation quality was adapted to three items developed by Javornic (2016). Perceived informativeness, perceived entertainment, and perceived credibility were used four-, three-, and three items from Brackett & Carr (2001), respectively. AR attitude was adapted from Dodoo & Youn (2021), a four-item scale. ARA attitude was adapted three items, developed by Feng & Xie (2018); Finally, to measure destination brand engagement, this study adapted four items from Sprott et al. (2009). All measurements used a seven-point Likert scale (1= strongly disagree to 7= strongly agree) to measure.

3.2 Data Collection

Considering the purpose of this study, three AR-based print advertising were developed. Data were collected by inviting 159 students at the university in Taichung, Taiwan. Students in the business school were recruited using a convenience sampling procedure. They were contacted via class teaching assistants. All of them received additional course credit as compensation after participating and following all the requirements the research assistant inquired about. Students were asked to randomly choose one of the three destinations- "Japan-Tokyo Skytree," "Thailand-Pattaya," and "United States-Yellowstone Park" by first reading basic travel information about the chosen destination and then asked to scan the QR code on the printed AR-based advertising to experience the AR-based 360-degree journey. At the end of their experience, online survey URLs were accessed to fill in the questionnaire.

Among 159 useful questionnaires, females (50.3%) are a little bit higher than males (49.7%), with a majority age range between twenty to twenty-five years old (75.5%). The most chosen destination is "United States-Yellowstone Park" (45%), followed by "Japan-Tokyo Skytree," (41%), and "Thailand-Pattaya (14%).

4. Result

4.1 Analytical Techniques and Measurement Properties

The methodology employed in this study involves the utilization of both measurement and theoretical models. Partial least squares structural equation modeling (PLS-SEM) was used in this study (Hair et al., 2014). This method is deemed suitable for cases where the sample size is relatively small to medium. It is also known for its enhanced statistical power, manifested as high efficiency in parameter estimation, as compared to the traditional covariance-based SEM method (Hair et al., 2014). The software Smart PLS 4 (Ringle et al., 2024) was employed for conducting the analyses in this study. Following Chin (1998) and Hair et al. (2014), the reflective measurement models were used to assess internal consistency reliability, indicator reliability, convergent validity, and discriminant validity.

The results revealed that all the CR values of the eight constructs ranged from 0.864 to 0.95, exceeding the 0.7 threshold (Hair et al., 2014) and indicating acceptable internal consistency. In addition, all the outer loadings were higher than 0.7, implying that all constructs exhibited satisfactory indicator reliability. Regarding the convergent validity, all the AVE values ranged from 0.782 to 0.909, higher than the threshold suggested by Fornell and Larcker (1981), indicating good convergent validity. For discriminant validity, Table 1 showed that all the square roots of the AVEs were greater than the off-diagonal correlations among the constructs, indicating that none of the cross-outer loading problems were achieved for any of the research constructs. The results revealed that the measurements satisfied the reliability and validity test.

Table 1 *Mean, Standard Deviation, and Correlation Matrix*

	Mean (SD)	IN	AQ	PI	PE	PC	AR	AT	BE
IN	4.976(1.427)	0.884							
AQ	4.887(1.495)	0.640	0.919						
PI	4.891(1.520)	0.616	0.541	0.887					
PE	4.665(1.695)	0.658	0.575	0.741	0.944				
PC	5.092(1.628)	0.550	0.505	0.711	0.659	0.953			
AR	5.396(1.169)	0.579	0.548	0.630	0.724	0.504	0.898		
AT	4.695(1.694)	0.621	0.523	0.728	0.821	0.674	0.732	0.942	
BE	5.178(1.509)	0.560	0.576	0.707	0.758	0.662	0.610	0.783	0.890

Notes: Square root of the AVE is on the diagonal; CR: 0.907(IN), 0.909(AQ), 0.864(PI), 0.939(PE), 0.95(PC) 0.92(AR), 0.936(AT), 0.12(BE). IN= perceived interactivity; AQ= Augmented Quality; PI= Perceived Informativeness; PE= Perceived Entertainment; PC= Perceived Credibility; AR=AR Attitude; AT=ARA Attitude; BE: Destination Brand Engagement

4.2 Testing the Hypotheses

To test the hypotheses, this study followed Hair et al.'s (2014) suggestion, using a nonparametric bootstrapping procedure with 5000 resamples to calculate the t-value.

The results in Table 2 revealed a significant relationship between perceived interactivity($\beta = 0.397$, $p < 0.001$) and augmentation quality($\beta = 0.297$, $p < 0.001$) on AR attitude, providing strong support for both H1 and H2. Contrary to the expectation, the results of H3 were non-significant, indicating that there is no support for a positive relationship between perceived informativeness and AR advertising attitude ($\beta = 0.190$, $p > 0.05$). Perceived entertainment ($\beta = 0.573$, $p < 0.001$) and perceived credibility ($\beta = 0.163$, $p < 0.05$) both have a positive effect on AR advertising attitude, confirming H4 and H5. Contrary to the hypothesis, the results of H6 were non-significant, indicating that there is no support for a positive relationship between AR attitude and destination brand engagement ($\beta = 0.082$, $p > 0.05$). For H7, the result indicated a positive relationship between AR advertising attitude and destination brand engagement ($\beta = 0.725$, $p < 0.001$).

Table 2 *Research Hypotheses Testing (n=159)*

Hypotheses Relationship	Coefficient	t value.	Supported
H1: IN→AR	0.397	4.026 ***	Yes
H2: AQ→AR	0.297	3.980 ***	Yes
H3: PI→ AT	0.190	1.952	No
H4: PE→ AT	0.573	6.256***	Yes
H5: PC→ AT	0.163	2.051*	Yes
H6: AR→BE	0.082	1.005	No
H7: AT→BE	0.725	12.057***	Yes

IN= perceived interactivity; AQ= Augmented Quality; PI= Perceived Informativeness; PE= Perceived Entertainment; PC= Perceived Credibility; AR=AR Attitude; AT=ARA Attitude; BE: Destination Brand Engagement
* P<0.05; **P<0.01; ***P<0.001
SMC: A$=0.382; AT=0.714; BE=0.611

5. Discussion

5.1 Conclusion and Discussion

Generally, this study is based on the Cognitive-Affective-Conation (CAC) model to propose a theoretical framework to understand the effects of AR advertising on destination brand engagement. More specifically, this study investigated how AR characteristics (perceived interactivity and augmentation quality) and ARA characteristics (perceived informativeness, perceived entertainment, and perceived credibility) through two attitudes- AR attitude and AR advertising attitude, respectively, which in turn influence destination brand engagement. The first finding shows how AR characteristics (perceived interactivity and augmentation quality) influence AR attitude respectively. In addition, the results showed that ARA characteristics (perceived entertainment and perceived credibility) influence AR advertising attitude, but perceived informativeness does not. Further, this study found that only attitude toward AR advertising positively affects destination brand equity rather than attitude toward AR. In

general, two of the seven hypotheses are non-supported. The findings of this research advance the understanding of AR advertising literature in the following:

Firstly, regarding the AR attributes, the effect of perceived interactivity on AR attitude is found in the current study, which is consistent with Arghashi & Yuksel (2022) in the AR apps field. Consistent with prior studies, support for the influences of augmentation quality on AR attitude provides evidence for the importance of examining this relationship in the AR-related field (Ahmad et al., 2023; Wu et al., 2023).

Secondly, in the aspect of AR advertising attributes, the result detected a non-significant relationship between perceived informativeness and attitude toward AR advertising, which affords further discussion points. This is inconsistent with previous AR advertising-related studies (Uribe et al., 2022), which have demonstrated this relationship. A possible explanation could be that when an individual sees a printed AR-based travel advertisement in this study, he/she mostly feels excited and subconsciously neglects the advertising information regardless of their attitude toward the advertising. Consistent with previous non-AR (Sharma et al., 2022) or AR advertising (e.g., Uribe, 2022), the findings in this study showed that perceived entertainment is identified as one of the important factors in shaping a positive attitude toward AR advertising. Like findings in advertising research (Adeline et al., 2023; Jiang et al., 2023), perceived credibility in this study is found to have a positive and significant impact on AR advertising attitudes.

Finally, another interesting finding is that the positive effect of AR attitude on destination brand engagement is insignificant. This is similar to previous literature indicating a "controversial" conclusion (e.g., Arghashi &Yuk, 2022; Rauschnabel et al., 2019). However, previous research offers a reasonable explanation for this study, that perhaps the AR results in greater cognitive dissonance (Romano et al., 2021); that is, the positive AR attitude from experiencing may stay on the virtual world, not transfer to the real destination, therefore, do not strengthen the engagement toward destination brand. Moreover, it is found that attitude toward AR advertising affects destination brand engagement significantly and positively. This result holds the same position as the existing AR advertising-related studies (e.g., Dodoo & You, 2021).

Theoretically, this study contributes to a better understanding of how consumers engaged in destination brands after experiencing AR advertising in current advertising-related studies. More specifically, guided by the cognition-affect-conation paradigm, this research developed a conceptual framework revealing how two types of cognition- AR characteristics (perceived interactivity and augmentation quality) and ARA characteristics (perceived entertainment and perceived credibility), particularly ARA characteristics can trigger individuals' positive attitude toward AR advertising the eventual response to positive destination brand engagement. This study extends not only previous understanding of the factors that drive brand engagement (e.g., Lee & Cho, 2023; Sung et al., 2022) or engagement (Dodoo & Youn, 2021; Arghashi & Yuk, 2022) in the digital reality field but also echoes previous studies in tourism and hospitality (e.g., Jiang et al., 2023; Chen et al., 2020; Kumar et al., 2023) who has demonstrated the importance of destination brand engagement but lack of evidence from AR advertising study.

5.2 Managerial Implications

As for managerial implications, the finding suggested that the attitude toward AR advertising, compared with the attitude toward AR, will be a key way to facilitate destination

brand engagement. This implies that the essence of advertising is still the key strategy for any destination. Using AR technology may effectively elicit individual sentiment, considering the advertising content that inherently transfers real destinations to digital reality is essentially the first priority.

For the advertising attribute, the content components, perceived entertainment, are found to be the most significant antecedent to forming a positive attitude toward AR advertising. Therefore, managers of destination brands need to add or incorporate any possible entertaining or enjoyable elements, such as users seamlessly interacting with the destination brand's information or stories integrated into AR advertising and their surroundings. This strategy could blur the lines between advertising content and the real world, creating entertaining experiences that resonate with AR advertising users.

Perceived credibility is confirmed as another critical feature positively shaping attitudes toward AR advertising. Therefore, managers of destination brands can design AR advertising so that their advertised information is truthful and believable, allowing users to believe the content, which leads to individuals' favorable attitudes toward AR advertising. Specifically, in this study, when users access the advertising, they can interact with the 360-degree AR "believable" content by swiping to generate their specific destination experiences.

5.3 Limitations and Future Research

This research has some limitations that require further attention while drawing inferences from the study findings. First, a cross-sectional study was conducted in this study, which captures the opinions of potential tourists (this study heavily relied on students from a single university in Taiwan) at a particular point in time, which may limit the generalizability of this study's findings. Future researchers can either collect more participants or adopt longitudinal data to provide further understanding and enhance the transparency and relevance of the findings of this study.

Second, the study focused on selected destinations (e.g., "Japan-Tokyo Skytree," "Thailand-Pattaya," and "United States-Yellowstone Park"). Additional studies may extend this research across different countries and destination brands, which may provide valuable insights into how cultural factors influence individuals' perceptions and interaction with AR advertising.

Lastly, this study only measures this construct using a single dimension of destination brand engagement. Future research should incorporate a multi-dimensional scale to explore its relationships with desirable antecedents proposed in this study. Moreover, some conation outcomes related to advertising effectiveness are also considered as potential constructs for further investigation.

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