International Journal of Advanced Culture Technology Vol.8 No.2 116-128 (2020)
DOI https://doi.org/10.17703/IJACT.2020.8.2.116

IJACT 20-6-16

The Effectiveness of Jeju Island Mixed Reality Tourism Application: Focusing on the Moderating Role of Users' K-Culture Involvement

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Abstract

In this study, we introduce a multi-modal mixed reality (MR) application for advertising the main touristic landmarks on Jeju Island, and evaluate its effectiveness based on the Technology Acceptance Model (TAM) with a focus on the user's involvement in Korean culture (K-Culture). Specifically, we deployed several stimuli to enable users to retrieve information, visualize a variety of heritage content such as text, images, videos, virtual artifacts, and immerse in a VR environment to experience the heritage locations. The results of the online survey with 436 participants showed that for consumers with low K-Culture involvement, Perceived Usefulness and Perceived Ease-of-Use did not affect their Intention to Visit the island. Still, it had a significant impact on their Intention to Use the application. On the other hand, for the group with high K-Culture involvement, Perceived Usefulness had no effect on the Intention to Use and Intention to Visit. However, Perceived Ease-of-Use had a significant impact on their Intention to Use the application and Intention to Visit Jeju Island. Therefore, when user involvement in K-Culture is high, convenience of use has played a significant role in sensory media usage and the intention to visit, regardless of the usefulness of the mixed reality content. In contrast, users with low K-Culture involvement primarily focused on the functional aspects of the application. These findings open the path for follow-up studies on K-Culture involvement and immersive media tourism marketing, which will benefit digital tourism marketing and Korea's tourism industry.

Keywords: *Tourism Advertising, Destination Marketing, Mixed Reality, K-Culture Involvement, Jeju Island.*

1. Introduction

The impact of the tourism industry on revitalizing the local economy is enormous, as several recent studies have pointed out. In Gangwon Province, where mountain tourism is more significant than in other provinces of Korea, the introduction of a tourism membership program between locals and tourists in Jeongseon-gun yielded good results for the sustainability of the economy, with an impact of 14.3–33.9% on the GRDP in the

Manuscript received: April 30, 2020/ revised: May 20, 2020/Accepted: May 26, 2020
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area [1]. Furthermore, investment in local tourism and culture-related industries in regions with a rich traditional culture, both in the metropolitan and rural areas of Korea, generated higher employment and productivity than in other sectors [2]. Jeju Island, located at the peninsula's southernmost point, was designated by UNESCO as a World Heritage Site in 2007 for its geographical and cultural richness and is at the top of Korea's most visited locations. The developed tourism infrastructure and the relaxed policies introduced by the self-governing municipality make the island an ideal destination for foreign visitors.

However, intensive tourism often causes increased pollution and traffic that negatively affects the local communities, so the need for sustainable development should be addressed primarily in the context of emerging smart tourism technologies. The use of digital media technology to facilitate the promotion and discovery of Korean cultural heritage is particularly relevant when considering the worldwide appeal of the Korean Wave (or Hallyu). In recent years, international fans have shown willingness to travel to Korea to experience the locations and culture they had initially discovered through K-pop and dramas. The popularity of Hallyu culture suggests the high potential of reaching international audiences online for the Korean tourism marketing industry.

Recently, the method of marketing for tourist attractions using mass media represented by TV has changed dramatically. With the advancement of digital media, advertising using immersive digital media such as virtual reality and augmented reality is also being actively utilized.

2. Research goal

Only a few studies have investigated the use and effectiveness of mixed reality (MR: combinations of the aspects of virtual reality and augmented reality) applications to promote a tourist destination. The goal of this research is to develop a multi-modal virtual reality (VR) / augmented reality (AR) application for advertising famous tourist destinations on Jeju Island and evaluate the effectiveness based on the Technology Acceptance Model (TAM). The authors further examine the potential role of Korean culture (K-Culture) involvement in the proposed model. In sum, this paper contributes to current research as it:

- Develops a multi-modal MR advertising application for promoting Jeju Island
- Evaluates the effectiveness of the proposed application using the TAM
- Examines the role of K-Culture involvement in the proposed model

3. Theory

Research in cultural heritage visitor experience and tourism marketing has increasingly focused on the use of immersive media technology. Jung et al. explored the use of augmented reality for cultural heritage conservation through the application PalmitoAR, which reenacts one of the most significant historical battlefields of the American Civil War, in Palmito Ranch, Cameron, Texas. The results pointed out the positive influence of visual design on the task technology, which in turn had a positive impact on perceived ease of use, and the latter had positive effects on the intention of use and perceived usefulness of the application [3].

Another study proposed a mobile AR acceptance model in the context of urban heritage tourism in Dublin, using five focus groups of young British female tourists to test a mobile AR application based on the TAM. The results indicated that perceived ease of use had a positive effect on perceived usefulness and the attitude towards using the app, in line with previous findings on the efficiency of AR technology for cultural heritage conservation [4]. The Hwaseong Fortress in Suwon is another UNESCO heritage location in South Korea where an AR technology was tested, to develop a complete AR mobile tour application for the general public with a focus on technology readiness and visual appeal [5]. In China, Lin at al. used a virtual reality presentation of a famous 700-year-old Chinese painting to investigate viewer nostalgia and intention to slow travel to the actual locations around Fuzhou in the Fujian Province, and Taipei and Taoyuan in Taiwan. The

findings showed that VR was effective in encouraging respondents to travel to the actual locations in a slower and more observational manner, and the user nostalgia was an essential factor that affected the intention to visit [6].

A recent study showed that sensory media consumers are more focused on the hedonic value than on the utilitarian value of the content, and emphasized the potential of VR/ AR technology in Korean tourism marketing targeting global tourists through a virtual model visualization application aimed at introducing the cultural heritage of Jeju Island [7]. Moreover, vividness was found to have a crucial effect on perceived immersion and enjoyment in the usage of a mixed reality application that tested brand awareness, brand association and brand loyalty. Specifically, the application evaluated how characteristics such as interactivity and vividness of mixed reality affected the emotional aspects of the experience and the satisfaction of visitors [8]. In terms of big data application to tourism, a recommendation system based on tourist site information through social network analysis was recently introduced. Specifically, the study deployed user personality information and deep learning technology to classify the types of tourism suitable for customers and identified the relationship between the tourist attractions and the typology through a network analysis of tourist keywords. The resulting information was then recommended through tagging on users' SNS and blogs [9].

The advantage of using VR is that a user can have a more vivid experience that is closer to reality. In contrast, AR has the benefit of making the media experience easier and more enjoyable to obtain information about a specific tourist destination in a more convenient way than VR. This study developed an MR application for the tourism marketing of Jeju Island, a representative tourist destination in Korea for overseas visitors. Further, we tested the advertising effect of the application using the TAM. As the Korean Wave (K-Wave) fever has exerted considerable influence worldwide in recent years, a growing number of foreign tourists are visiting Korea to enjoy the K-Wave. Therefore, to build an advertising effectiveness model [7], this study explored how the advertising effectiveness of MR depends on the audience's involvement in the K- Wave.

As described above, studies related to cultural heritage experience and tourism marketing using immersive media have been published actively. Building on the findings of existing scholarship, this study aims to measure the effectiveness of the developed MR service designed to promote tourism of Jeju Island, South Korea's leading cultural heritage.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a model designed to describe the acceptance and use of information technology [10]. Since Davis first proposed it, the model has been widely used to measure user effects in many areas of engineering and social science beyond the dimension of information technology use. The technology acceptance model proposes perceived usefulness and perceived ease of use as the two key factors that affect reliability, attitude, and acceptance intentions associated with new technologies [11]. According to Davis, perceived usefulness refers to the extent to which users of a particular technology or service feel it is useful, and perceived ease of use means the degree to which users feel that a specific technology or service is easy to use [10][12]. According to the TAM, the higher the usefulness and ease the user perceives for a technology and service, the higher the willingness to accept new technologies and services [12].

The Task-Technology-Fit Model (TTFM) is an extension of the TAM [13] that has been used and validated in various studies [14-16]. This model suggested that task technology fit influences the performance outcome. Specifically, the TTFM proposed that technology must be 1) utilized and 2) a good fit with the tasks it supports, to have positive impacts on individual performance. Their findings suggested that task-technology-fit influences perceived ease-of-use. When designing an application, visual design (or visual appeal) plays a vital role in retaining customers as it increases trust and loyalty [17]. For example, Hartmann et al. argued that "beauty matters, and it influences decisions that should be independent of aesthetics" [18]. Consequently, consideration for visual design has been embraced in many domains, which supports the premise that visual attractiveness positively influences the perceived usefulness [19].

Korean Culture Involvement

Krugman (1965) introduced the concept of "involvement" to consumer science and defined it as "the degree of connection or association between the content of persuasive stimuli that an individual provides to himself and the content of his life, or the intensity associated with them" [20]. In advertising research, involvement refers to given personal importance and interest in an advertised object [21]. Consequently, involvement has become an essential variable in consumer behavior research. In general, people's attitudes vary depending on the degree of involvement. Consumers with a high degree of product involvement in Internet shopping have a more positive effect on the shopping experience because of their high interest in products [22-23]. In other words, consumers with high involvement are more active in information exploration activities than those with low involvement. They have a higher preference and understanding of the relevant product or brand [21].

The Korean culture (*Hallyu*) began to spread to Japan, China, and parts of Southeast Asia in the mid-1990s and is a cultural phenomenon centered on young people that admire and learn about popular Korean entertainers in music, drama, fashion, games, and food [24-25]. Moreover, Hallyu reached well into the Middle East though media productions and prompted an increasing number of Arab visitors to South Korea for medical tourism. A recent study that measured Middle Eastern Arab patients' level of satisfaction with Korean medical services pointed out the importance of communication and translation services and the availability of halal meals [26]. According to previous studies in the field of advertising, involvement affects not only the attitude dimension of brand evaluation but also the behavioral dimension of purchase intention [27-28]. In particular, previous studies revealed that involvement in the brand determines advertising effectiveness [29-30].

An individual's involvement in K-Culture is expected to affect attitudes and use of products and services related to Korea, and it may further affect their intention to visit Korea. Therefore, this study intends to examine how the intention of using the MR service for cultural tourism and the intention to visit the tourist destination will vary depending on the K-Culture involvement of service users.

4. Hypotheses and research question

Building on the literature review, this research introduces the following hypotheses:

H1: Perceived visual design will have a positive effect on perceived task technology fit.

H2: Perceived visual design will have a positive effect on perceived usefulness.

H3: Perceived task technology fit will have a positive effect on perceived ease of use.

H4: Perceived ease of use will have a positive effect on perceived usefulness.

H5: Perceived usefulness will have a positive effect on intention to use the MR service.

H6: Perceived ease of use will have a positive effect on intention to use the MR service.

H7: Perceived usefulness will have a positive effect on intention to visit Jeju Island.

H8: Perceived ease of use will have a positive effect on intention to visit Jeju Island.

These hypotheses translated into the following research model:

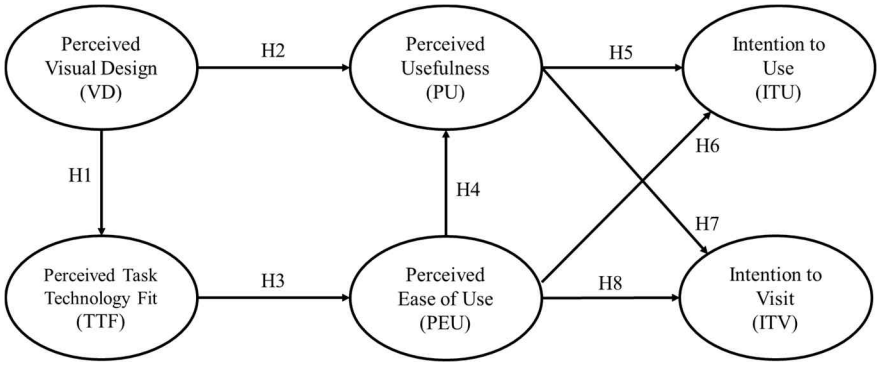

Figure 1. Conceptual research model.

Next, we are going to explore how the above-structured research hypotheses change according to the high and low level of involvement of consumers with the Korean Wave using the MR service.

Research Question:

- How do the intention of using tourism the MR service and the intention to visit Jeju Island depend on the difference in users' involvement in the K-Culture?

Stimuli

We implemented the MR(VR/AR) application using JavaScript libraries to advertise Jeju Island tourism, namely *JejuView*. Specifically, the app required several key components: Three.js [31], a cross-browser JavaScript library and Application Programming Interface (API) to create and display animated 3D contents in web browsers, Mapbox GL JS [32], a WebGL JavaScript library used to render interactive maps, A-Frame [33], a web framework using a custom component to create VR experiences, and AR.js [34] an open-source library built on top of ARToolkit and integrated with A-Frame. Previous studies projected VR/AR applications for dedicated devices, but we aimed to make the VR/AR integrated MR experience more accessible to the general public by using their smart device with a built-in web browser. Our approach was recommended in the study of Nguyen et al. [35-36]

Accordingly, *JejuView* aims to introduce visitors to a high-level view of heritage locations on Jeju Island. In designing the application, we considered a four-step approach: (1) retrieve information from a heritage site, (2) visualize a variety of heritage content such as text, images, videos, and virtual artifacts 3) immerse oneself in a VR environment, and 4) experience a heritage location in the actual physical world.

Figure 2. The Virtual Reality component: A) utility section where users can toggle information on or off, B) virtual assistant to support users, C) configuration section to update heritage information

In addition to the VR feature, *JejuView* introduces users to storytelling about Jeju Island through the application's AR component. The main interface of the AR component is presented in Figure 3, and it consists of six buttons positioned at the top of the screen (note that the QR code at the bottom right is not part of the visual design). The QR code informs users they can use their smartphone camera to conveniently open the link without having to enter a long URL manually. To position the Harubang on the printed map, the application uses a marker-based approach, which consists of a system with an easily detectable image. As soon as the image was detected, we extracted its location and then superimposed the 3D artifact on it.

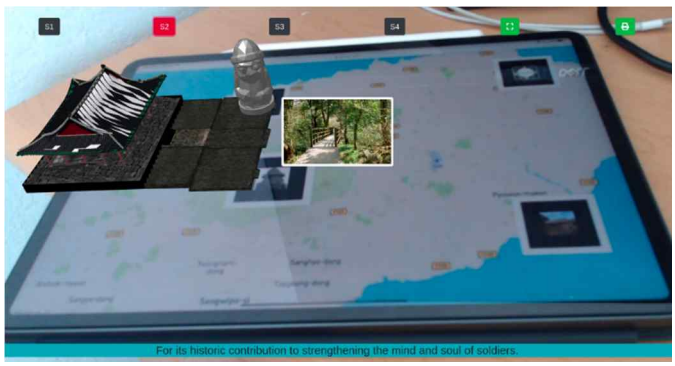

Figure 3. The main interface of the AR component.

5. Experiment

In order to test the hypotheses, an online survey was conducted with 436 participants recruited from Amazon Mechanical Turk for user experience research. Respondents were asked to fill in a Google Form, which included a YouTube video link and 33-question items comprising 22 questions for TAM user behavior, 8 questions for K-Culture involvement, and three questions for demographic information. The first part of the survey covered questions about personal attitude, and behavioral intention of using *JejuView* and K-Culture Involvement, which were assessed with a 5-point Likert scale [(1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree]. In the second part, participants were asked to provide general demographic information such as gender, ethnicity, and English as a first language. The six key constructs used to develop the questionnaires were *Perceived Task Technology Fit* (TTF) (adapted from [16]), *Perceived Visual Design* (VD) [19], *Perceived Usefulness* (PU) [10], *Perceived Ease Of Use* (PEU) [10], *Intention To Use* (ITU) [10], and *Intention To Visit* (ITV) [10]. Also, the application users' *Korean Culture Involvement* (KCI) was measured [37-38]. Table 1 introduces the list of items we used to measure each construct.

Table 1. Constructs and items

Construct
Perceived Task Technology Fit
(TTF1) The application is adequate for the described scenario of "Jeju Island Cultural Tour".
(TTF2) The application is compatible with the task of controlling virtual objects.
(TTF3) The application fits the task (i.e., experiencing and learning the culture of Jeju Island) well.
Perceived Visual Design
(VD1) The visual design of the application is appealing.
(VD2) The size of the 3D virtual objects is adequate.
(VD3) The layout structure is appropriate.
Perceived Usefulness

(PU1) Using this application would improve my understanding of "Jeju Island".
(PU2) Using this application, I would accomplish tasks (e.g., learning cultural knowledge) more quickly.
(PU3) Using this application would increase my interest in cultural events.
(PU4) Using this application would enhance my effectiveness on the task (i.e., learning cultural knowledge).
Perceived Ease-Of-Use
(PEU1) Learning to use the VR/AR application would be easy for me.
(PEU2) I would find it easy to get the VR/AR application to do what I want it to do.
(PEU3) My interaction with the VR/AR application would be clear and coherent.
(PEU4) I would find the VR/AR application to be flexible to interact with.
(PEU5) It would be easy for me to become skillful at using the MR(VR/AR) application.
(PEU6) I would find the VR/AR application easy to use.
Intention to Use
(ITU1) I intend to use the VR/AR application in the near future.
(ITU2) I intend to check the availability of the MR(VR/AR) application in the near future.
Intention to Visit
(ITV1) I will visit Jeju Island after experiencing the VR/AR application.
(ITV2) I intend to visit Jeju Island frequently after experiencing the MR(VR/AR) application.
(ITV3) I will continue to visit Jeju Island in the future after experiencing the MR(VR/AR) application.
(ITV4) I want to recommend Jeju Island to others after experiencing the MR(VR/AR) application.
K-Culture Involvement
(KCI1) Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie) is meaningful to me.
(KCI2) Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie) is important to me.
(KCI3) Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie) is valuable to me.
(KCI4) I am interested in Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie).
(KCI5) I am very related to Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie).
(KCI6) I get joy from the Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie)
(KCI7) Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie) has influence on me
(KCI8) I need Korean culture (K-Culture: e.g., K-POP, K-drama, K-movie).

Out of a total of 436 questionnaires, we handed out, 406 participants yielded usable data responses. Table 2 shows the classification and percentage of the participants in each category. 57.9% of the participants were male, and 41.1% were female. A majority of the participants reported English as a first language (82.8%), and 15.5% were not. A majority of the participants were Caucasian (42.4%), 37.2% were Asian, 9.6% were African-American, 3.9% were Hispanic, 3.2% were American Indian/ Alaska Native, 0.2% were Native Hawaiian/ Pacific Islander, and 2.7% reported "other" ethnicity.

The high and low K-Culture involvement groups were defined by a median split method [39]. For the grouping, we first calculated the mean score of eight K-Culture involvement items (Mean = 3.37, SD = 1.03, Median = 3.50). Using the median score of 3.50, we conducted a median split on the K-Culture involvement mean score and used the result in subsequent structural equation modeling analysis to facilitate analytic ease and communication clarity. The mean and standard deviation of the high K-Culture involvement group on the mean scale were 4.22 and 0.41, while those of low K-Culture involvement group were 2.54 and 0.73.

In order to test the hypotheses, we used a web-based software for generalized structure component analysis [40]. The generalized structured component analysis (GSCA) [41] addresses the component-based structure equation modeling (SEM) and is best suited for a small sample size without rigid distributional assumptions [42-43]. As such, GSCA was conducted separately for high and low K-Culture involvement groups to explore configural differences in the hypothesized model by comparing each directional path among the constructs (latent variables) between the groups of high and low K-Culture involvement.

Table 2. Demographic information for the sample

Variable		Full Sample N	Full Sample %	Low K-INV N	Low K-INV %	High K-INV N	High K-INV %
Gender	Male	235	57.9	118	57.8	117	57.9
	Female	167	41.1	83	40.7	84	41.6
	Not to Say	4	1.0	3	1.5	1	0.5
English as First Language	Yes	336	82.8	168	82.4	168	83.2
	No	63	15.5	33	16.2	30	14.9
	Missing	7	1.7	3	1.5	4	2.0
Ethnic Heritage	Caucasian/White	172	42.4	100	49.0	72	35.6
	African American/Black	39	9.6	19	9.3	20	9.9
	American Indian/Alaska Native	13	3.2	6	2.9	7	3.5
	Asian	151	37.2	63	30.9	88	43.6
	Native Hawaiian/Pacific Islander	1	0.2	-	-	1	0.5
	Hispanic/Latino	16	3.9	8	3.9	8	4.0
	Other	11	2.7	6	2.9	5	2.5
	Missing	3	0.7	2	1.0	1	0.5
Total		406	100	204	100	202	100

6. Results

The descriptive statistics of the six constructs by groups are shown in Table 3. All means are above the midpoint of 3, and the standard deviations range from 0.73 to 1.33. The means of the group with high K-Culture involvement were higher than those of the group with low K-Culture involvement across all the items of constructs.

Table 3. Means and Standard Deviations of Measures

Construct	Item	Low K-INV (n=204) Mean	Low K-INV (n=204) SD	High K-INV (n=202) Mean	High K-INV (n=202) SD
Perceived Task Technology Fit	TTF1	3.20	1.25	4.01	1.04
	TTF2	3.43	1.16	4.10	0.92
	TTF3	3.56	1.23	4.13	0.90
Perceived Visual Design	VD1	3.76	1.09	4.37	0.73
	VD2	3.34	1.20	4.16	0.85
	VD3	3.79	1.13	4.37	0.74
Perceived Usefulness	PU1	3.83	1.17	4.37	0.79
	PU2	3.60	1.14	4.26	0.78
	PU3	3.54	1.15	4.23	0.80
	PU4	3.60	1.15	4.31	0.77
Perceived Ease-Of-Use	PEU1	3.63	1.06	4.18	0.83
	PEU2	3.49	1.06	4.15	0.91
	PEU3	3.46	1.02	4.12	0.85
	PEU4	3.39	1.05	4.17	0.81
	PEU5	3.53	1.08	4.19	0.80
	PEU6	3.56	1.11	4.22	0.82
Intention to Use	ITU1	3.00	1.13	4.13	0.85
	ITU2	3.00	1.14	4.13	0.86
Intention to Visit	ITV1	2.50	1.12	4.04	0.88
	ITV2	2.37	1.16	4.00	0.98
	ITV3	2.46	1.14	4.01	0.88
	ITV4	2.88	1.22	4.25	0.73

The hypothesized model provided FIT (overall goodness of fit index in GSCA) values of .604 and .665 for the high and low K-Culture involvement groups, respectively, indicating that the model accounted for 60.4% and 66.5% of the total variance of the six constructs and their items (i.e., the total variance of all observed and latent variables). Tables 4 present the loading estimates for the items along with standard errors (SEs) of the parameter estimates calculated from 100 bootstrap samples. To determine the statistical significance of the parameter estimates, a 95% bootstrap percentile confidence interval (CI) was calculated—i.e., a parameter estimate is assumed to be statistically significant at .05 alpha level if the CI does not include the value of zero. All the loading estimates were statistically significant, indicating that all those items were good indicators of the constructs.

Table 4. Estimates of Loadings by Groups

		Low K-INV			High K-INV		
Construct	**Item**	Loading	SE.	95% CI	Loading	SE.	95% CI
Perceived Task Technology Fit	TTF1	0.86	0.02	(0.82, 0.90)	0.85	0.02	(0.81, 0.88)
	TTF2	0.84	0.02	(0.80, 0.88)	0.83	0.03	(0.77, 0.87)
	TTF3	0.88	0.02	(0.83, 0.92)	0.83	0.04	(0.74, 0.89)
Perceived Visual Design	VD1	0.88	0.02	(0.84, 0.91)	0.82	0.03	(0.77, 0.87)
	VD2	0.77	0.04	(0.69, 0.85)	0.76	0.05	(0.65, 0.84)
	VD3	0.89	0.02	(0.85, 0.92)	0.80	0.04	(0.71, 0.87)
Perceived Usefulness	PU1	0.84	0.03	(0.79, 0.89)	0.77	0.05	(0.62, 0.85)
	PU2	0.91	0.01	(0.88, 0.93)	0.80	0.04	(0.71, 0.87)
	PU3	0.88	0.02	(0.84, 0.91)	0.83	0.03	(0.78, 0.89)
	PU4	0.87	0.03	(0.81, 0.92)	0.84	0.03	(0.77, 0.88)
Perceived Ease-Of-Use	PEU1	0.87	0.02	(0.82, 0.91)	0.81	0.03	(0.74, 0.86)
	PEU2	0.87	0.02	(0.81, 0.90)	0.84	0.03	(0.77, 0.88)
	PEU3	0.88	0.02	(0.83, 0.91)	0.80	0.03	(0.73, 0.85)
	PEU4	0.81	0.03	(0.76, 0.86)	0.77	0.04	(0.68, 0.84)
	PEU5	0.86	0.02	(0.83, 0.89)	0.83	0.03	(0.77, 0.88)
	PEU6	0.89	0.02	(0.86, 0.94)	0.81	0.03	(0.73, 0.86)
Intention to Use	ITU1	0.94	0.01	(0.92, 0.96)	0.89	0.02	(0.85, 0.92)
	ITU2	0.93	0.01	(0.92, 0.96)	0.87	0.02	(0.83, 0.91)
Intention to Visit	ITV1	0.91	0.01	(0.89, 0.94)	0.85	0.02	(0.81, 0.89)
	ITV2	0.90	0.01	(0.87, 0.92)	0.84	0.02	(0.81, 0.89)
	ITV3	0.90	0.01	(0.87, 0.93)	0.82	0.04	(0.72, 0.87)
	ITV4	0.79	0.04	(0.72, 0.86)	0.65	0.08	(0.47, 0.77)

The structural model with path coefficients for the high and low K-Culture involvement groups are depicted in Figures 4 and 5, respectively. For the group with high K-Culture involvement, Visual Design had statistically significant and positive influences on Task Technology Fit (H1 = 0.668, SE = 0.051, 95% CI = 0.581-0.778) and Perceived Usefulness (H2 = 0.341, SE = 0.065, 95% CI = 0.219-0.467). Task Technology Fit had a statistically significant and positive influence on Perceived Ease-of-Use (H3 = 0.713, SE = 0.063, 95% CI = 0.571-0.813), which in turn had statistically significant and positive effects on Perceived Usefulness, Intention to use, and Intention to visit (H4 = 0.561, SE = 0.062, 95% CI = 0.437-0.682; H6 = 0.664, SE = 0.090, 95% CI = 0.507-0.854; H8 = 0.359, SE = 0.127, 95% CI = 0.102-0.584). However, Perceived Usefulness had no statistically significant effects on Intention to use and Intention to visit (H5 = 0.122, SE = 0.092, 95% CI= −0.061-0.314; H7 = −0.034, SE = 0.145, 95% CI = −0.302-0.259).

For the group with low K-Culture involvement, Visual Design had also statistically significant and positive influences on Task Technology Fit (H1 = 0.704, SE = 0.043, 95% CI = 0.637-0.796) and Perceived Usefulness

(H2 = 0.498, SE = 0.058, 95% CI = 0.373-0.628). Task Technology Fit had a statistically significant and positive influence on Perceived Ease-of-Use (H3 = 0.579, SE = 0.067, 95% CI = 0.403-0.704), which in turn had statistically significant and positive effects on Perceived Usefulness (H4 = 0.423, SE = 0.066, 95% CI = 0.252-0.532). However, Perceived Usefulness and Perceived Ease-of-Use had no statistically significant effects on Intention to visit (H7 = 0.123, SE = 0.108, 95% CI = −0.085-0.344; H8 = 0.113, SE = 0.113, 95% CI = −0.118-0.309). On the other hand, Perceived Usefulness and Perceived Ease-of-Use had statistically significant effects on Intention to use (H5 = 0.337, SE = 0.109, 95% CI = 0.133-0.556; H6 = 0.228, SE = 0.106, 95% CI = 0.034-0.423)

It might be highlighted that the significance of the path coefficients was not the same between the two groups. For the group with low K-Culture involvement, Perceived Usefulness and Perceived Ease-of-Use had no statistically significant effects on Intention to visit. In contrast, they had statistically significant effects on Intention to use. For the group with high K-Culture involvement, Perceived Usefulness had no statistically significant effects on Intention to use and Intention to visit. In contrast, Perceived Ease-of-Use had statistically significant effects on Intention to use and Intention to visit.

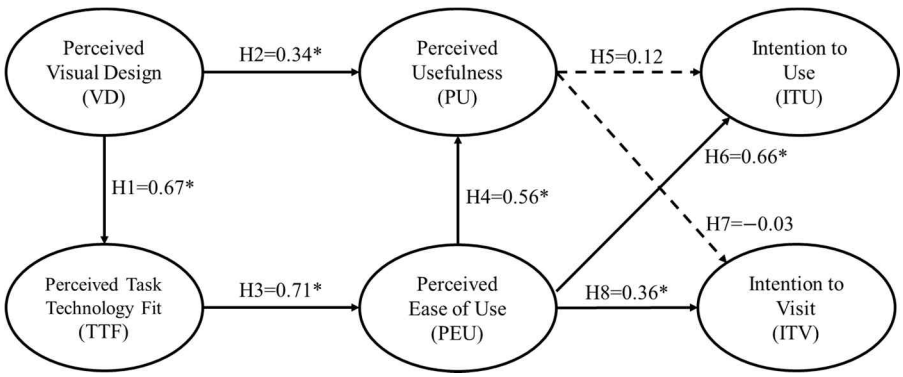

Figure 4. Structural Model for the Group with High K-Culture Involvement

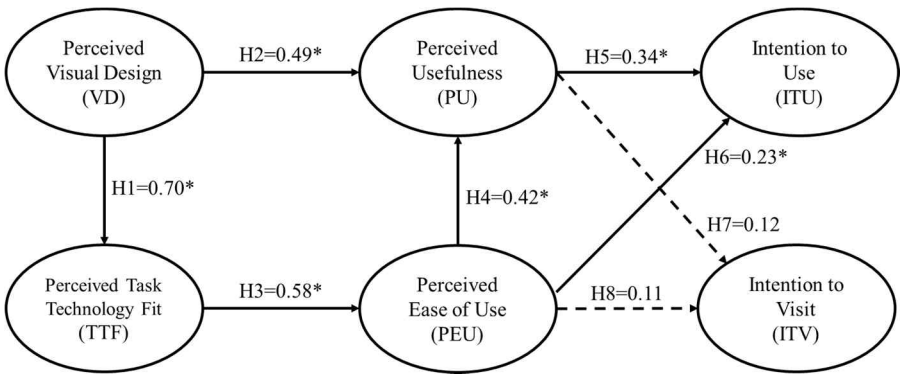

Figure 5. Structural Model for the Group with Low K-Culture Involvement

7. Discussion

In this study, we developed the MR application for advertising Jeju Island's tourist attractions and verified its user effects. The TAM was applied to measure user perceptions toward the proposed MR service in terms of task technology, visual design, perceived usefulness, perceived ease of use, intention of use, and intention to visit Jeju Island. Notably, we tested whether there are structural differences in the audience effect process based on the high and low levels of users' K-Culture involvement.

According to the results of the study, the perceived usefulness (PU) did not have a meaningful impact on the use of MR service and the intention of visiting Jeju Island for the high-involvement group. On the other hand, in the low-involvement group, perceived usefulness (PU) had a significant effect on the use of MR service. Moreover, in the case of perceived ease of use (PEU) only the high-involvement group had a positive effect on the intention to use the MR service (ITU) and the intention to visit Jeju Island (ITV).

When interpreting the above results, it can be understood that when user involvement in K-Culture is high, only convenience of use has played a significant role in media usage and the intention to visit Jeju Island, regardless of the usefulness of MR content. On the other hand, in the group with low K-Culture involvement, only the perceived usefulness (PU) has affected media use (ITU). Here, the PU did not even lead to a visit to Jeju Island. It can be understood that the low K-Culture group primarily concerns the functional aspects of the MR service.

8. Conclusion

Despite the academic and practical value of this study, several limitations should be discussed below. First of all, our analysis is based on online survey research. Therefore, strict control, such as laboratory research, was not achieved. Also, the media effect may have been reduced by half because the subjects did not experience the actual MR application, but indirectly engaged with the application video images. It can be considered that if a user had the real VR/AR experience, the intention to use the service or visit the tourist attractions would have been higher. Therefore, it will also be significant for future studies to test this research process in a laboratory setting.

As confirmed in this study, there were structural differences between users' intention to use the service and the intention to visit tourist attractions depending on the degree of interest in K-Culture. We hope that Korea's tourism industry will be further developed through follow-up studies on tourism promotion advertising using immersive media.

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