Tourists Perceived Value and Experience Preference based on AR Technique

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---- A Study on Potatso National Park, China

Introduction

China is developing the eco-tourism to realize the harmony between human and nature, and gradually established the national park management system, and it is critical to understand what visitors prefer from their park experience and their perceived value in order to attainment their benefits. However, there is still lack of research and practical experience in the national park visitor behavior. At the same time, with increasingly booming of AR technology, the combination of new technology and tourism attraction has brought vitality to tourism industry. This study is to provide valuable insight on enhancing the tourism experience of fun and interactive immersion, and enriching tourists' natural and cultural knowledge, etc..

Literature Review

Perceived Value and Preference

Individuals are guided by their evolving preferences of the natural world, and preferences is an expression of underlying human needs, while there is a lack of research on tourism experience preference (Crouch, 2016). Madrigal (1994) predict tourists' preference based on the personal value system, and the results showed that value system predict activities more effectively than demographic characteristics. Lee (2007) studied the relationship among gender difference, attraction features, and tourism experience preference, and found that female tourists prefer more on socialization, while male tourists prefer more on natural environment. It is believed that tourists' preference is an important factor influence motivation and satisfaction (Hassell, Moore, & Macbeth, 2015), and is strongly impacted by previous experience (Crouch, 2016).

Perceived value as a theoretical and empirical construct has recently been receiving increased attention in tourism research. It is defined as 'a customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations' (Woodruff, 1997, p. 142). However, there is very limited research that has examined the perceived value of experience in tourist behavior in national park context (Prebensen, Woo, Chen, & Uysal, 2012). This paper established a specific perceived value dimension based on the background of Potatso National Park.

AR Technology

Augmented Reality (AR) is a kind of visualization technology, which overlays digital content onto real objects. In tourism context, it creates an enjoyable and realistic learning environment directly to enhance the experience in destination (Dieck, 2016). Although AR is regarded as a protection tools on resource and heritage features, some researchers have proposed that whether to accept such alternative also depends on the attitude of the tourists and their requirement for authenticity

(Guttentag, 2010). However, because social development and the tourist preferences of new generation change, and the purpose and effect of virtual technology usage are different, AR has great development potential as a new technology.

In China research on AR technology in tourism are mainly concentrated on the key technique, application advantages, user experience characteristics, digital display, and system development/ application in terms of cultural tourism experience. For example, the tracking registration algorithm and experimental analysis of AR technology in the digital landscape reconstruction of Summer Palace (Chen & Wang, 2010). Currently in tourism field, AR technology development in China mainly focus on cultural tourism resources and products, while in recent year there is a noticeable trend of applying AR on smartphones. However, there has been a lack of primary research in examining Chinese visitors' AR preferences in national park and whether or not visitors perceive they attain beneficial outcomes from these experiences.

In summary, the existing tourism experience research provides a good theoretical foundation, but there is a need on more empirical research of Chinese AR experience, especially in the context of national park where require environmental resources protection. This current research is trying to study Potatso NP in Yunnan Provence as a case, by applying AR technology in tourists experience, investigate the relationship of tourist preference and perceived value to profile potential tourist market characteristics of Chinese national park.

Methodology

Characteristics of Study Area

As the research site, Potatso National Park is located in the northwest Yunnan and the center of world natural heritage -- "three rivers flow", possessing natural villages of Tibetan culture at the same time, in 2007 become the first domestic national park, formally approved by Yunnan province, and is a typical national park among the 10 national park pilot areas in China. Potatso National Park has various biological resources, beautiful natural scenery, and rich recreational resources, but tourism activities are mainly sightseeing still, and tourism experience is under-developed.

Questionnaire Design

The questionnaire is designed including three sections: the tourists' perceived value, AR experience preference, and demographic information. The measurement scale were established based on the literature review and researchers' previous field research. There are six dimensions of tourist perceived value including nine items: *hedonic value* (PV1 & 2), *emotional value* (PV3, 4, & 5), *cultural cognitive value* (PV6), *nature knowledge value* (PV7), and *social value* (PV8 & 9). As for AR experience preference, there are seven measurement items covering dimensions on *memorable, educational, cultural, temporal, emotional, fun,* and *social.* The questionnaire used the Likert five-point scale (1 as very reluctant to and 5 as very willing to).

Data Collection

In March 2017, online questionnaire was conducted with a mobile APP named Questionnaire Star, to target the respondents who have intention to visit Potatso National Park. With a snowball sampling method, the respondents who were initially sought by the researchers recommended

more respondents and ensured that the demographic factors of the sample was in a big range and representative. Within two weeks, 322 questionnaires were collected, and 100% valid due to the setting up of compulsory survey questions. Furthermore, the data were examined on the validity and reliability to ensure the sample quantity meeting the requirement of research need.

Results

1. Profile of Respondents

1.1 Demographic Characteristics of Respondents

According to the survey results, 57. 8% of respondents under 35 years old, mainly holding a Bachelor's degree or postgraduate education (85.4%). In terms of the occupation, most are enterprises staff (39.1%), then students (28.9%). Single respondents are 44.1% and married respondents are 54.6%. Among married respondents, 48.4% are married with children. The majority of respondents (86.6%) were never visited Potatso National Park (Table 1).

Table 1. Respondents profile.

character	number	%	character	number	%
Gender			**Have been to Potatso**		
Male	143	44.4	Yes	43	13.4
Female	179	55.6	No	279	**86.6**
Age			**Occupation**		
Below 25	109	**33.9**	management level	40	12.4
26-35	77	23.9	staff	126	**39.1**
36-45	80	24.8	government & institute	20	6.2
46-55	46	14.3	freelance	15	4.7
56-65	8	2.5	student	93	28.9
Above 65	2	6	stay at home	3	0.9
			others	25	7.8
Marriage Status			**Education**		
single	142	44.1	high school or below	13	4
married with child	156	**48.4**	college	34	10.6
married without child	20	6.2	bachelor	173	**53.7**
other	4	1.2	master/PhD	102	31.7

1.2 Important Perceived Values and AR Preference.

According to the results of mean value shown in Table 2, the top three important perceived values are “can release the pressure and be relaxed (PV1; *M*=4.51)”, “can be close to the nature (PV3; *M*=4.36)”, and “can improve the interrelationship of friends/ family (PV9; *M*=4.28)”. The top three preferred AR experience are “scan some national conservative plants to get the information on attribute/character/protection (AR2; *M*=4.31)”, “scan the landscape of the meadow to see the video image of wild animals migrating (AR6; *M*=4.23)”, and “scan a specific scene to get different views of the four seasons (AR4; *M*=4.19)”. (+content)

Table 2. Important perceived value and AR preference.

Construct and indicator	N	Mean	Std Dev
Perceived value			
PV1.Can release the pressure and be relaxed	322	4.51	.652
PV3.Can be close to the nature	322	4.36	.684
PV9.Can improve the interrelationship of friends/family	322	4.28	.718
PV2. Joy and excitement	322	4.16	.754
PV4. Spirit purify and growth	322	4.14	.816
PV5. Explore new thing and satisfy curiosity	322	4.04	.804
PV6. Get to know Shangri-La′s local custom	322	3.98	.864
PV7. Enhance knowledge of flora and fauna	322	3.96	.804
PV8. Know interesting people and make friends	322	3.52	1.008
AR Preference			
AR2.Scan some national conservative plants to get the information on attribute/character/protection	322	4.31	.716
AR6.Scan the landscape of the meadow to see the video image of wild animals migrating	322	4.23	.729
AR4.Scan a specific scene to get different views of the four seasons	322	4.19	.788
AR1.A national park AR brochure bring home the AR experience	322	4.15	.837
AR3. Scan residential area to see the 3D virtual performance of ethnic minority	322	3.93	.904
AR5."Treasure hunt" (interactive game with reality)	322	3.92	.942
AR7.Share feelings with people who is using apps nearby	322	3.60	.920

2. One-Way ANOVA analysis

One-Way ANOVA analysis was conducted in SPSS 19.0, to examine the significant differences among demographic factors in terms of the perceived value and AR experience preference respectively.

2.1 Perceived value based on demographic characteristic

There are some significant differences among the demographic characters in terms of perceived value as explained as following:

Gender. There is significant gender difference in terms of PV1 and PV6 (Table 3-1). For female it is more important to release and be relaxed in Potatso National Park, and more like to know Shangri-La's local custom.

Age. The result also shows that there is significant different between age groups in terms of PV3 (Table 3-2). Age between 26 and 35 is more intend to be close to the nature, while age between 18 and 25 are not that interested in this perceived value.

Whether been to Ptatso before. There is significant difference on PV1 and PV6 between group of respondents have been to Potatso before and group that not been to (Table 2-5). On the one hand, it seems that respondents have been to Potatso more recognized the feeling of relaxation after seeing the nature scenery, which reflect their high quality experience on this aspect. While because

the local custom is not available for most tourists, they did not think they can perceive the value of getting to know Shangri-La's local custom. On the other hand, according to respondents who have never been there, they really wish they could experience some local custom.

Table 3-1. Gender difference on perceived value.

		One-way ANOVA		*F*-value	Sig.
	Over all mean	Male (N=143)	Female (N=179)		
PV1.Can release the pressure and be relaxed	4.51	4.43	4.58	4.509	.034
PV6. Get to know Shangri-La's local custom	3.98	3.85	4.07	5.193	.023

Table 3-2. Age difference on perceived value.

		One-way ANOVA		*F*-value	Sig.
	Overall mean	18-25 (N=109)	26-35 (N=77)		
PV3. Can be close to the nature	4.36	4.19	4.58	3.180	.008

Table 3-3. Whether been to Potatso before influence on perceived value.

		One-way ANOVA		*F*-value	Sig.
	Over all mean	Yes (N=43)	No (N=279)		
PV1.Can release the pressure and be relaxed	4.51	4.70	4.48	4.509	.034
PV6. Get to know Shangri-La's local custom	3.98	3.53	4.04	5.193	.023

2.2 AR experience preference based on demographic characteristic

Gender. There is significant gender difference in terms of AR2, AR3, and AR5 (Table 3-4). It shows comparing with male respondent, female more prefers "scan some national conservative plants to get the information on attribute/character/protection (AR2)", "scan residential area to see the 3D virtual performance of ethnic minority (AR3)", and "Treasure hunt" (interactive game with reality; AR5)".

Marital status. There is significant difference between in terms of AR3 and AR7 (Table 3-5). According to a pos-hoc analysis of Tukey HSD, marital status of "other" is significant different with the other three groups. Single and married (with or without child) respondents more prefer on "scan residential area to see the 3D virtual performance of ethnic minority (AR3)", and "share feelings with people who is using apps nearby (AR7)", demonstrated these three groups are more social tendency. But again, because there are only four respondents' marital status are "other", the result may need to be further examined with more sample size in the future.

Table 3-4. Gender difference on AR experience preference.

	One-way ANOVA

	Overall mean	Male (N=143)	Female (N=179)	*F*-value	Sig.
AR2.Scan some national conservative plants to get the information on attribute/character/protection	4.31	4.20	4.39	5.574	.019
AR3. Scan residential area to see the 3D virtual performance of ethnic minority	3.93	3.79	4.03	5.848	.016
AR5."Treasure hunt" (interactive game with reality)	3.92	3.77	4.03	6.364	.012

Table 3-5. Marital status difference on AR experience preference.

	Overall mean (N=322)	One-way ANOVA				*F*-value	Sig.
		Single (N=142)	Married with child (N=156)	Married without child (N=20)	Other (N=4)		
AR3. See the 3D virtual performance	3.93	3.88	3.98	4.10	2.50	3.987	.008
AR7.Share feelings with people	3.60	3.60	3.59	3.90	2.25	3.677	.013

3. Correlation Analysis

Correlation analysis was conducted in SPSS 19.0, to examine the significant relationship between perceived value and AR experience preference among the respondents. According to the results, all of the PV variable and AR variable showed significant correlation (sig. = .000). We analyzed the medium (0.5>r>0.3) and strong (1.0>r>0.5) correlation based on *r* value as shown in Table 4.

Table 4. Correlation on perceived value and AR experience preference.

Pearson Correlation	PV6	PV7	PV8	PV9
AR2		.418(**)		
AR3	**.580(**)**		.425(**)	
AR4		.377(**)		
AR5	.415(**)			
AR6		.395(**)		
AR7	.438(**)		**.512(**)**	.414(**)

** Correlation is significant at the 0.01 level (2-tailed).

First, according to the result, the strongest correlation is *r* =.580. These respondents prefer AR3, also feel it is important to achieve PV6. At the same time, there is a medium correlation between AR3 and PV8 (*r* = .425). We can conclude that respondents prefer *scanning residential area to see the 3D virtual performance of ethnic minority* (AR3) also feel it is important to achieve their perceived value of *get to know Shangri-La's local custom* (PV6), and *knowing interesting people* (PV8). Similar, the result shows there is correlation between AR7 and PV6, PV8 and PV9 respectively, which means AR experience of s*haring feelings with people who is using apps nearby*

has a strong correlation with perceived value of *knowing interesting people and make friend* (r = .512), and has a medium correlation with perceived value of *getting to know Shangri-La's local custom* (r = .438), as well as *improving the interrelationship of friends/family* (r = .414). The above results demonstrate that there is correlation of cultural and social dimension on both AR preference and perceived value.

Second, the result shows that respondents prefer AR2, AR4 and AR6 also feel it is important on the perceived value of PV7. To be specifically, to achieve the perceived value of *enhance knowledge of flora and fauna* (PV7), these respondents prefer the following three AR experience: *scanning some national conservative plants to get the information on attribute/character/ protection* (r = .418), *scan a specific scene to get different views of the four seasons* (r = .377), *scan the landscape of the meadow to see the video image of wild animals migrating* (r = .395). At the same time, there is correlation between AR5 and PV6, which could be explained as *Treasure hunt game* is a good method to realize the perceived value of *getting to know Shangri-La's local custom* (r = .415). This is because we provide an example of "treasure" as "minority jewelry", and the game is collect enough jewelry to win the prize. This indicate that the respondents when increasing knowledge also prefer having fun during the experience. The above results shows the correlation on educational dimension and during tourists travel.

Conclusion and Discussion

This research studies Potatso NP in Yunnan Provence as a case, explored the AR adoption potential with experiential attributes and tourists perceived value of Chinese before visiting national park. The results profile the tourist market of AR experience in National Park, and demonstrate that there is correlation of cultural and social dimension on both AR preference and perceived value. This indicate that the respondents when increasing knowledge also prefer having fun during the experience. The above results also shows the correlation on educational dimension.

On the one hand, in this study the AR technology designed in national park experience can well match the respondents' perceived value on knowledge-seeking and social interaction. On the other hand, according to the above analysis, hedonic and emotional perceived value (PV1-5) were ranked as quite important perceived value by the respondents, while there is relatively weak causal relations between these values and the AR experience. This may because current designed AR experience cannot effectively realize these two dimensions of perceived value, and it can only be fulfilled by the authentic experience in the nature. Further studies is suggested on applying qualitative methods such as in-depth interviews and observations to provide additional insights regarding the AR experience design to better satisfy the hedonic and emotional needs. At the same time, more data could be collected during pre-tested period in Potatso National Park when the APP is ready, to get more information on AR experience.

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