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Ubiquitous Tour Information: the Relationships between Service Quality, Perceived Enjoyment, and Behavioral Intention

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ABSTRACT

This study explored the service quality of ubiquitous mobile tour information, which has been emerging as a new solution in its integration with providing tour information services. with advancement of mobile technologies. The study also expanded on the effect of user's perceived quality on enjoyment and usage intention. The demonstrative analysis result, from users' firsthand interaction with the mobile tour information, led to classifications of ubiquitous tour information service quality; the classifications of four factors consisted of: 'performance', 'information', 'design', and 'convenience'. While the design' and 'convenience' factors did not have a significant impact, the 'performance' and 'information' factors had a significant impact on perceived enjoyment. The aforementioned four factors of service quality were proven to have impact on usage intention. Out of the four factors, 'performance' proved to have the highest impact on usage intention. Managerial implications based on the results are discussed.

Keyword

Ubiquitous tour information service, perceived enjoyment, usage intention

INTRODUCTION

Along with technological development, ubiquitous computing system has been widely constructed around our surroundings. The circumstances concerning the services has changed from a restrictive space associated with offices and homes to the mobility and freedom that comes with mobile-based spaces. Ubiquitous computing improves computing systems, in which information processing has been thoroughly integrated into the daily lifestyle of politics, economic issues, society, and culture. In addition, it has transformed people's lifestyles, along with a level of consciousness. In particular, it has been predicted that ubiquitous computing will be highly utilized as a new paradigm in the tourism industry. In fact, the development of ubiquitous services is coming into fruition in the tourism sector within the information-intensive industry.

Several recent studies (Budde, 2002) have shown that South Korea has been leading the world in every segment of the telecommunications market, ranging from broadband growth to mobile applications. Over the past several years, the South Korean government has tried to construct a foundation for the system via Internet, mobile and ubiquitous devices, all of which is utilized to provide instant tour information services, including tour attractions, accommodations, restaurants and geographical locations.

Tourists, using the service, would be able to get instant and direct information quickly on directional guidance as well as options for restaurants and attractions while traveling. Thus, tourists would save not only their time but would be able to find points of interest or attractions with minimal effort, which differed from the past, in which limited tourism services were

available. Based on data from mobile phones, such as smartphones, tourists' preference of attractions and activities can be reflected in further improvements to specifically cater to tourists. In the future, ubiquitous computing systems in the tourism industry will be widely carried out and play a crucial role in increasing the attractiveness of tour sites, providing optimal convenience to tourists.

As users desire to meet various forms of information technology, the emotional response is becoming more of an essential variable. Moreover, as the level of service quality is on the increase, emotional factors, such as enjoyment, indicate higher user behavior and satisfaction rather than utilitarian or cognitive factors (Hong and Tam, 2006). As individual use of information technology and system has become more popularized, understanding the individual's perception is more inevitable for service quality purposes (DeLone and McLean, 2003; Janda et al., 2002; Pitt et al., 1995).

The purpose of this study is to explore the service quality of ubiquitous mobile tour information. Also, to assess how the user's perception of quality of service is related to emotional responses and behavioral intention. The study is expected to provide useful information for ongoing and future purposes of operating ubiquitous tourism information service.

BACKGROUND

Information search plays a significant role for tourists in providing reassurance and relieving uneasy feelings of being in a foreign destination, which increases the quality of tourism (Fodness and Murray, 1997). This is beneficial for individual tourists with no access to a professional tour guide, and need correct, prompt information on tourist attractions. While tourists in the past usually depended on possibly outdated, tourists can now trust the wireless information, due to the plethora of information available at their fingertips, especially reviews or advice written by other tourists.

Services for mobile tourism information mainly provide not only integrated web services, but also provide payment for accommodations, restaurant, tourist attractions, and activities. Likewise, electronic devices offer tracking services, such as tracking the accompanied person, location, directional guidance, and information on discounts. Recently, smartphones and PDAs have been fitted with a newly built tour information system. In Korea, local governments struggle to construct advanced tourism information services, notably Jeollabukdo Province and Busan City. This study targets Hanyok Village, located in Jeonju City, which initially launched its own tourism information system in Korea during April 2007.

The ubiquitous tourism information service in Jeonju Hanyok Village uses a system of four languages for its indoor tour services, as serviced by RFID and directional guidance directed by GPS. Tourists can obtain a tour-specific device at the tour info center, and be guided with information of facilities in the Hanyok village, such as restaurants, accommodations, and souvenir shops. Since April 2007, Hanyok village has been in full operation of providing mobile tourism info services. Hence, the criteria allows it to be used as a suitable subject for this study. Therefore, the survey was conducted on visitors who had firsthand experience with the mobile tourism information service.

Figure 1. Flow of Ubiquitous Tour Information Service



(source: Jeon-ju Media Information Service)

e-Service Quality

Pitt et al. (1995) suggested that ‘service quality’ should be added to DeLone and McLean (1992) IS success model. They assessed SERVQUAL's validity and argued that service quality is an important factor in measuring IS success, and it has a significant impact on user satisfaction. Other researchers (Ketinger and Lee, 1995; Li, 1997) have agreed with this, arguing the need for a service quality measure to be included in IS success. Later, DeLone and McLean (2003) accepted the idea and proposed to include service quality in IS success model, aside from system quality, and information quality. They also suggested service quality as an important factor for customer satisfaction. On the basis of aforementioned study, service quality has become instrumental in adoption of IT and SERVQUAL has been applied to examine IT quality.

Zeithaml, who first developed SERVQUAL, along with his fellows, developed e-SERVQUAL to measure e-service quality, which includes seven dimensions (Zeithaml et al., 2002). Szymanski and Hise (2000) suggested a model of e-satisfaction, which included four quality dimensions: online convenience, merchandising (product offerings and product information), site design, and financial security. Janda et al. (2002) developed five dimensions to assess Internet retail service quality: performance, access, security, sensation, information, -and examined if these factors predict behavioral intention. Kim et al. (2009) examined the effects of system quality, Information quality, and service quality on use of ubiquitous computing. The measurements are as follows: system quality (accessibility, stability, ease of use), information quality (relevance, accuracy, timeliness), service quality (reliability, quickness, secrecy). Among these variables, accessibility, accuracy, timeliness, quickness is revealed to have positive association with the use of ubiquitous computing.

Perceived Enjoyment

Individuals may accept technology because its use creates fun and enjoyment, which represent affective and intrinsic benefits. While the affective components regarding IS have been discussed as well as the cognitive components or beliefs, the affective dimension had not been treated as a distinct factor (Goodhue, 1988). Research studies, regarding information seeking focused on cognitive approach and affective behavior, have been recognized as an integral part in developing a holistic understanding of an individual's approach to information-seeking and use. Thompson, et al. (1995) making a distinction between affective and cognitive components of attitude, presented the factors influencing the utilization of personal computers, which suggested that attitude involves cognitive, affective, and behavioral components. They included “Affect towards PC use” as a factor associated with utilization of PCs. Davis et al. (1992) defined ‘enjoyment’ as the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated. They found that perceived enjoyment had significant effect on users’ intention to use computer programs in the workplace.

Since mobile data service has often been used for personal purpose rather than for work purpose, perceived enjoyment would be a major factor affecting behavioral intention. In Hong and Tam’s (2006) work regarding mobile data service, perceived

enjoyment was shown to be the strongest factor in explaining behavioral intention. Teo et al. (1999) also found perceived enjoyment to be positively related to frequency of Internet usage and daily Internet usage. Wu et al. (2007) claimed that cognition is the process of information processing. A cognitive activity begins with attention and ends with decision-making. Attention can lead thoughts, regulate emotions and direct activities. They suggested a model based on emotional-attention and decision-making information cooperation, i.e., user model, including emotion style for the tourism information system.

HYPOTHESES DEVELOPMENT

According to Arnould (1960), affect comes out when a person evaluates oneself whether certain incidents are beneficial or harmful. That is to say, in accordance with how consumers cognize stimulus or objects, they can feel the related affect. This viewpoint has been the key concept for making cognitive evaluation model. Lazarus (1991) also mentioned that cognitive evaluation would be a necessity and sufficient condition to form affect. Based on those points of view, this study will suppose that cognitive evaluation on the service quality of ubiquitous tourism information service influences on the users' affect. The researches related on IS use 'enjoyment' as the related affect of using IS but it is used as independent variable influencing on behavioral intention or belief (Agarwal and Karahanna, 2000; Van der Heijden, 2004; Hong and Tam, 2006; Chea and Luo, 2008).

According to the research on games, the main purpose is user pleasure, hence, enjoyment has been used as major research concept (Kamis and Koufaris, 2008; Fang and Zhao, 2009; Agarwal and Karahanna, 2000). Agarwal and Karahanna (2000) posited the relationship between gaming environment and enjoyment. Song and Han's (2009) study, regarding the mobile phone service, posited the relationship between content quality and perceived enjoyment, which was supported in the empirical research. Therefore, we intend to explore the relationship between service quality of ubiquitous tour information and perceived enjoyment.

H1: Service quality of ubiquitous tour information has a significant effect on perceived enjoyment.

The main objectives of IS assessment in workplace were limited to system quality, information quality (Delone and Mclean, 1992). But as the use of IS has integrated into the daily lifestyle, the requirement for service quality has been increased, so service quality is being used as the main variable of IS assessment and has effect on behavioral intention. Szymanski and Hise (2000) included convenience, product information, site design, and financial security for determinants of e-satisfaction in regard to internet shopping and ascertained the influence of these service quality factors on consumer satisfaction. Janda et al. (2002) developed five dimensions for assessment of Internet retail service quality: performance, access, security, sensation, information; they ascertained these have strong predictive power for estimating satisfaction, word-of-mouth, complaining and likelihood of future purchase. Kim et al. (2009) found that service quality factors, such as quickness, have a positive effect on the use of ubiquitous computing. Based on prior literature studies, the following hypotheses have been developed.

H2: Service quality of ubiquitous tour information has a significant effect on usage intention.

Studies with theoretical grounding have shown that emotional experiences impact attitude, such as Fishbein and Ajzen's study (1975) which claims that emotional experiences create positive or negative beliefs, and consequently impact attitudes of customers. Numerous studies have investigated the impact of emotion on consumer behaviors in traditional store and service settings. Researches on IS adoption have mainly discussed influence of perceived enjoyment. Davis et al. (1992) theorized perceived enjoyment to be an intrinsic motivation that directly influences intention to use PCs. Teo et al. (1999) perceived enjoyment to be positively related to frequency of internet usage and daily internet usage. Enjoyment was used as an independent variable affecting attitude (Kim et al., 2007). In Hong & Tam's (2006) study regarding mobile data service, perceived enjoyment was shown to be the strongest factor in explaining (behavioral intention). Chea and Luo (2008) also regarded recommendations to be affect-driven behaviors, and presented the relationship between affective response and recommendation intention. Therefore, we posit the relationship between perceived enjoyment and behavioral intention.

H3: Perceived enjoyment has a significant effect on usage intention.

Research Methodology

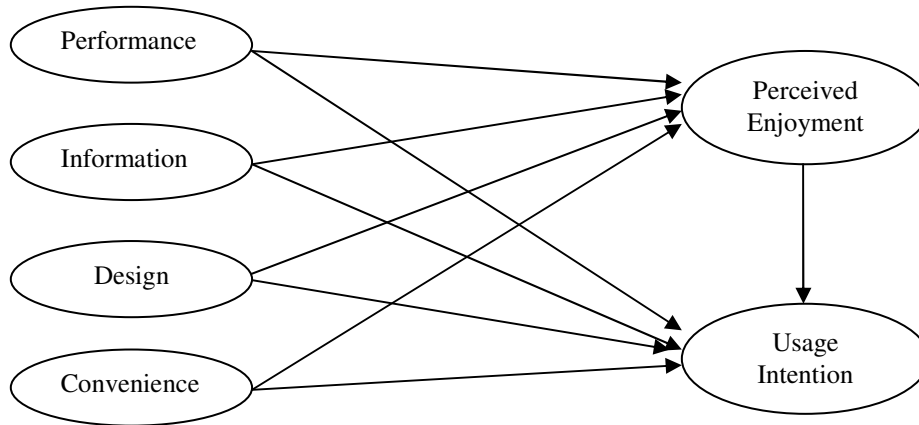
The study conducted a preliminary survey on mobile users based on the discussion of SERVQUAL, for purposes of measurement criterion of service quality of ubiquitous tourism information. The survey was conducted involving subjects who visited Jeon-ju Hanyok Village from August 20, 2009 to September 20, 2009. The survey asked open-ended questions, such as: “Why do you use information appliances?”, “What makes you satisfied with it and unsatisfied with it?”, and others. A total of 60 pieces of preliminary questionnaires were collected.

The answers pertaining to the service quality items were classified into four factors. First, ‘performance’ was addressed, such as fast connection speed to the system, smooth operation without errors, and real-time information supply based on location. Second, ‘useful information’, such as information on various tours and detailed tour information. Third, ‘the aesthetic aspect of service device’, such as refined design of the screen or the device itself, or overall coordination of images on the device screen. Fourth, ‘the convenience factor’, such as the simplicity of operating the instrument, the amount of time and effort saved in conducting the operation, and user friendliness in operating and navigating the instrument.

During the preliminary survey, interviews were conducted with tour directors, and administrators of the Department of Culture and Tour of Jeonju City Hall. As reflected in the preliminary survey results, the administrator also acknowledged the instability of the system. The administrator stated that the service may experience interruptions due to weather or unforeseen obstacles, so users complained on its inconvenience. Furthermore, the administrator also noted that the lack of effective communication caused problems, especially regarding contents update after the service development.

Based on the survey results and related literature, the questions in the instrument were re-worded for clarity purposes. The items were measured on a five-point scale. The main survey was conducted from October 1, 2009 to December 30, 2009, and was distributed to the weekend visitors by undergraduate students majoring in tourism. The surveyors rewarded the respondents with a small gift; the same respondents were asked to use a mobile service device and return it, considering many visitors had not previously used mobile tourism service devices. A total of 279 usable research instruments were collected for data analysis.

Figure 2. Research model



H_{1a}: Performance of ubiquitous tour information service has a significant effect on perceived enjoyment

H_{1b}: Information of ubiquitous tour information service has a significant effect on perceived enjoyment

H_{1c}: Design of ubiquitous tour information service has a significant effect on perceived enjoyment

H_{1d}: Convenience of ubiquitous tour information service has a significant effect on perceived enjoyment

H_{2a}: Performance of ubiquitous tour information service has a significant effect on usage intention

H_{2b}: Information of ubiquitous tour information service has a significant effect on usage intention

H_{2c}: Design of ubiquitous tour information service has a significant effect on usage intention

H_{2d}: Convenience of ubiquitous tour information service has a significant effect on usage intention

H₃: Perceived enjoyment has a significant effect on usage intention

Measurement

Table 1. Survey items

Factors	Survey items	References
Performance	-Fast connection speed to system -Stable screen conversion -Smooth operation without errors -Real-time information based on location -Function to save user’s preferences	DeLone and McLean(1992), Tseng and Wu(2007), Janda et al.(2002)
Information	-Offers accurate tour information -Offers various tours information -Offers detailed tour information -Offers the information that user needs	Seddon(1997), Li(1997), Rai et al.(2002), Delone and McLean(2003), Davis(1989), Janda et al.(2002)
Design	-Easy to read and view the main menu screen, -Refined design of screen -Overall coordination of images on device screen -Appropriate color and image of device screen	Szymanski and Hise(2000)
Convenience	-Simplicity of instrument operation -Save time and effort in conducting operation -Easy navigation of instrument operation	Davis (1989), Davis et al. (1992), Rai et al. (2002), Teo et al. (1999)
Perceived enjoyment	-It was enjoyable to use it -It was interesting to use it -It was bothersome to use it	Koufais (2002) Davis et al. (1992), Teo et al. (1999)
Usage intention	-It was satisfying for using mobile instrument -User will recommend to others to use it -User will use this kind of tour information service instrument in the future	DeLone and McLean (2003)

ANALYSIS

We conducted an exploratory factor analysis to obtain scope of measured items, based on the preliminary survey with users and related literatures. Consequently four factors were classified and overlapped item- ‘Easy to read and view the main menu screen’- was deleted to raise, concept-wise, the internal consistency in research. Reliability level of each factor was high beyond 0.8 of Cronbach’s Alpha modulus. The average value of each factor showed the assessment level of information was the highest by 3.507 and the next was for design by 3.281, for convenience by 3.188 and for execution by 3.023 respectively.

Table 2. Exploratory Factor Analysis on Service Quality Items

Measured item	Performance	Information	Design	Convenience
Fast connection speed to system	0.634			

Stable screen conversion	0.650			
Smooth operation without errors	0.769			
Real time-information based on location	0.791			
Function to save user's preferences	0.721			
Offers Various tour information		0.842		
Offers Detailed tour information		0.877		
Offers accurate tour information		0.830		
Offers tour information which user needs		0.601		
Refined design of screen or terminal			0.746	
Overall coordination of images on device screen			0.810	
Appropriate color and image of device screen			0.800	
Simplicity of instrument operation				0.819
Easy to learn instrument operation				0.783
Save time and effort in obtaining operation				0.600
Eigen value	3.080	2.762	2.369	2.171
Variance explained(%)	20.531	18.415	15.791	14.473
Cronbach's alpha	0.843	0.845	0.838	0.801
Mean	3.023	3.507	3.281	3.188

Table 3. Reliability and Confirmatory Factor Analysis

Constructs	Items	Cross loading	T-value	C.R.	AVE
Performance	Fast connection speed to system	0.782	26.863	0.889	0.616
	Smooth operation without errors	0.840	43.981		
	Stable screen conversion	0.794	24.051		
	Real time information supply based on location	0.792	31.925		
	Function to save user's preferences	0.710	18.609		
Information	Offer Various tour information	0.866	45.093	0.896	0.684
	Offer Detailed tour information	0.849	34.056		
	Offer accurate tour information	0.850	39.055		
	Offer tour information which user needs	0.737	18.402		
Design	Refined design of screen or terminal	0.854	30.878	0.903	0.756
	Overall coordination of images on device screen	0.880	44.499		

	Appropriate color and image of device screen	0.873	41.238		
Convenience	Easy to learn instrument operation	0.89	50.467	0.883	0.715
	Simplicity (Convenience) of instrument operation	0.813	24.068		
	Save time and effort on obtaining operation	0.832	35.400		
Enjoyment	It was interesting to use it	0.948	122.395	0.945	0.896
	It was enjoyable to use it	0.945	103.568		
Usage Intention	It was satisfying for using mobile instrument	0.838	33.670	0.914	0.780
	User will recommend to others to use it	0.923	57.506		
	User will use this kind of tour information service instrument in the future	0.886	52.575		

Table 4. Correlation matrix of the constructs

	Stability	Information	Design	Convenience	Enjoyment	Usage intention
Stability	0.785					
Information	0.340	0.827				
Design	0.601	0.399	0.869			
Convenience	0.607	0.443	0.554	0.846		
Enjoyment	0.467	0.407	0.384	0.426	0.947	
Usage intention	0.616	0.392	0.526	0.571	0.570	0.883

*The bold numbers represent square root of each construct

Reliability Assessment

Discriminant validity was assessed by comparing the AVE associated with each construct to the correlations among constructs (Fornell and Larker, 1981). In order to claim discriminant validity, the square root of the AVE, associated with a particular construct, must be greater than its correlations with other constructs (Fornell and Larker, 1981). According to the estimates provided in Table 5, each construct sufficiently differed from other constructs and, therefore, the measures represented discriminant validity. Internal consistency reliability was assessed by composite reliability (CR); each reliability exceeded the recommended .70 threshold (Nunally, 1987; Fornell and Larker, 1981; Thompson et al., 1995), as shown in Table 3 and Table 4. Combined with the strong evidence for convergent and discriminant validity, the measurement model appears to be acceptable.

RESULTS

While design and convenience of ubiquitous tour information service is not associated with perceived enjoyment (design: $\beta=0.055$, $t=0.729$, $p> 0.05$, convenience: $\beta= 0.120$, $t=1.523$, $p> 0.05$), performance and information show significant relationship with perceived enjoyment (performance: $\beta=0.281$, $t=3.812$, $p< 0.01$, information: $\beta= 0.237$, $t=4.192$, $p< 0.01$).

performance show higher effect on enjoyment than information. In the relationship between service quality factor and usage intention, all of the four service quality factors have significant association with perceived enjoyment. Performance had higher impact on usage intention ($\beta=0.354$, $t=5.798$, $p<0.01$) followed by convenience ($\beta=0.227$, $t=2.994$, $p<0.01$), design ($\beta=0.142$, $t=2.367$, $p<0.01$) and information ($\beta=0.114$, $t=2.228$, $p<0.05$). Enjoyment is significantly related with usage intention ($\beta=0.295$, $t=5.791$, $p<0.01$).

Table 5. Hypotheses and Results

	Hypothesis	β	T-value	R ²	Results
H _{1a}	Performance → enjoyment	0.281	3.812**	0.300	Supported
H _{1b}	Information → enjoyment	0.237	4.192**		Supported
H _{1c}	Design → enjoyment	0.055	0.729		Not supported
H _{1d}	Convenience → enjoyment	0.120	1.523		Not supported
H _{2a}	Performance → usage intention	0.354	5.798**	0.528	Supported
H _{2b}	Information → usage intention	0.114	2.228*		Supported
H _{2c}	Design → usage intention	0.142	2.367*		Supported
H _{2d}	Convenience → usage intention	0.227	2.994**		Supported
H ₃	Enjoyment → usage intention	0.295	5.791**		Supported

* $p<0.05$, ** $p<0.01$

CONCLUSION

Development of recent mobile technology enables mobile information services to be adopted in various areas. Researches, accessed in view of real users of mobile service, are few thus far (Kim et al., 2009). While few researches have evaluated the scenario-based approach (Oh and Xu, 2003; Xu, 2007), many researches have been conducted on efficiency and mechanism of mobile service. Thus, this study has merit in which the provided information is more practical, based on directly obtained results via surveys with real users of mobile tour information service.

This study was conducted to grasp service quality based on users’ perceptions of ubiquitous information service. Also, this study investigated impacts of those factors on users’ enjoyment and their usage intentions. The results, based on the survey of real users, are expected to be instrumental in providing useful guidance on not only design but also emerging IS applications. The demonstrative analysis results, from users’ firsthand interaction with the mobile tour information, led to classifications of ubiquitous tour information service quality; the classifications of four factors consisted of: ‘performance’, ‘information’, ‘design’, and ‘convenience’. While ‘design’ and ‘convenience’ did not have a significant impact, ‘performance’ and ‘information’ impacted perceived enjoyment significantly. In the case of user’s hedonic motive of service, which is high, the requirement for the aesthetic aspect increases in addition to the impact on emotion, which is most likely to be high (Mano and Oliver, 1993; Reinmer and Kohen, 2005). Performance proved to have more relation than information, based on our deductions, which was caused by unstable mobile service of Hanyok village, due to weather or unforeseen obstacles. The demonstrative analysis results support this, given that the factor average of performance was the lowest out of four service factors. All factors of service quality proved to have impact on usage intention. Out of the four factors, ‘performance’ was analyzed to have the highest impact on usage intention, which, as mentioned earlier, was caused partly by unstable provided service. The service quality factor, which had the second highest impact on behavior intention, was shown to be ‘convenient’.

Ubiquitous tourism information service will be enlarged in the future, but as expected, it is still in its nascent stage, there are some unstable aspects. Accordingly, service providers are required to construct a stable and secure system. In addition, providing updated information, such as ‘Function to save user’s preferences’ or ‘Real-time information based on the location system’, will be instrumental in catering to tourists. Continuous updates to contents shall be required through smooth communication between the service development company and administrators. Looking to the future, the aim is to provide

exceptional tour guide service, in which users can access tour information seamlessly and conveniently without any technical glitches or interruptions in the service.

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