

# Classification and Evaluation of Service Requirements in Mobile Tourism Application Using Kano Model and AHP

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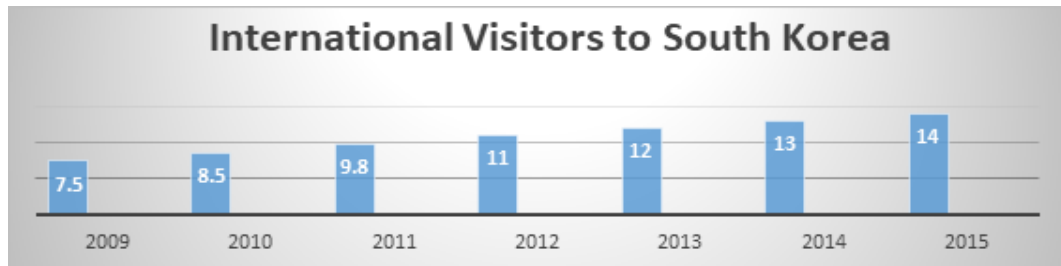
## I. Introduction

Most of the people use mobile applications during their travel and make their hotel reservations based on the user comments and ratings on mobile applications. In addition, they choose their venues of interest using GPS and map applications. This phenomenon indicates the impact of technological tools on

people and their trust in mobile applications (Bicena and Sadikoglu, 2016). With today's rapid development and the introduction of smartphones, many mobile applications have become a part of our lives (Dewitt and Siraj, 2011). Active use of social media and several applications has made the individuals use technology in their daily lives. As the social media and smartphone applications are using

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<Figure 1> International Visitors to South Korea in millions

more commonly, users share their vacation experiences with which leave a certain amount of impression on people (Xiang and Gretzel, 2010). Mobile technology is playing an increasing role in the tourist experience, and a growing body of tourism research has focused on this area. However, there are very few studies on classifying the actual service requirements and improving the customer satisfaction in mobile tourism applications. Mobile applications have the potential to personalize the tourist experience. According to the World Travel and Tourism Council, “Travel and Tourism generated US\$7.6 trillion (10% of global GDP) and 277 million jobs (1 in 11 jobs) for the global economy in 2014. Recent years have seen Travel and Tourism growing at a faster rate than both the wider economy and other significant sectors. Such as automotive, financial services and healthcare.

Visitors from emerging economies now represent a 46% share of these international arrivals (up from 38% in 2000), proving the growth and increased opportunities for travel from those in these new markets”. According

to Korean Tourism Organization data, there is a steady growth in the number of visitors visiting South Korea. In 2009, the number of international visitors in South Korea was 7.5 million, as years fold the number of visitors has increased dramatically Figure 1. In 2012, 11.1 million foreign tourists visited South Korea making it the 20th most visited country in the world, and the 6th most visited countries in Asia. Therefore, It is very crucial to put the focus on the creating a convenient tool to fuel the Korean Tourism Industry to the next level. The advancement in digital technology is at very rapid speed and its influence on technology especially, mobile internet devices are among one where there is a continuous growth.

### 1.1 Research Objectives and Method

The purpose of this study is to classify and categorize the service requirements in the mobile tourism applications. Thus, enhance and simplify the life of people, tourist in particular, to boost their travel experiences.

First, we classified the customer's service requirement in mobile tourism applications by using qualitative research methods of focus study with a group of tourists both Korean and foreigners. Second, we used Kano Model to evaluate the customer satisfaction and the service requirements. The customer satisfaction coefficient is measured by the frequency of the quality attribute, and we used the analytic hierarchy process (AHP) method to prioritize the weight on each service attributes so that we can rank the importance of each service requirement in order. The reason we used Kano Model and AHP is that Kano model helps classify the service requirements in mobile tourism applications and AHP helps rank the service requirement on the priority base. It helps us implicate the important aspects of the use of these two methods together. Technologies such as mobile device are transportable smart computer and have become part of our lifestyles (Wang et al., 2014). Based on literature reviews such as Wang et al. (2014) smartphone and mobile devices can play a key role in mediating the tourist experience. Therefore, classification and evaluation of service requirements in mobile tourism applications are very crucial. In the tourism sector, few research papers focus on classification and evaluation of tourism service requirements in mobile applications. This study is unique and practical in its approach to the use of Kano and AHP. Li et al. (2009) used

this integrated model to analyze customer requirements and illustrated the effectiveness of this model by case study. Alroaia et al. (2011) analyzed the importance of e-banking service factors on customer satisfaction through the combined Kano model and AHP. Hemati and Ghorbanian (2011) applied the hybrid Kano-AHP model to transportation service elements and ranked the service factors for customer satisfaction. The use of Kano Model and AHP as methodology provide categorization and evaluation of service requirements in mobile tourism applications. As, the service requirements in mobile tourism applications were provided through the focus group study. We were able to classify and categorize these service requirements with the help of KANO methodology. Finally, AHP helped us rank these classified service requirements in priority order. The special about AHP is that we conducted the test with experts in the tourism field.

## **II . Theoretical Background**

### **2.1 Mobile Tourism Applications**

Mobile technologies enable a new way of travelling as 'digital tourists,' for whom the travelling experience is empowered by the information and entertainment coming (though not exclusively) their new 'travel buddy': the

mobile technology device (Palumbo et al., 2014). The tourism industry must not lose the chance to attract this new kind of empowered tourist. Today, we carry our smartphones everywhere we go, using them for communication, maps, and many other purposes that make our lives easier. The mobile and wireless technology incorporated into smartphones and other mobile devices has an increasing impact on everyday life. Smartphones and mobile devices can play a key role in mediating the tourist experience since tourists use mobile technology before, during, and after the travel (Wang et al., 2012). Smartphones and mobile devices can help travelers' decision-making process through the provision of easy access to information anywhere and at any time, and by enabling travelers to learn of new travel opportunities and to become more familiar with destinations (Brown and Chalmers, 2003) customer service quality, banking service product quality, and online systems quality; (Rasinger et al., 2007). With a growing number of users, applications are increasingly influential in tourism travel decisions and behavior at all stages of tourism consumption (Wang et al., 2011). Mobile use has softened the normal time-and-place related constraints and is allowing individuals a more spontaneous negotiation of their meetings with other people, places, and the things they need during the course of tourist. In tourism, mobile applications the feature that allows rating

system used on such websites as TripAdvisor depends on users also has positive impressions (Banerjee and Chua, 2016). The comments and ratings made by many different users allow other users to be informed about the places that they would like to visit, accommodate, and trust such places (Baka, 2016; Jeacle and Carter, 2011). Active use of social media and several applications has made the individuals use technology in their daily lives and touristic activities and make their choices on this basis. As the social media and smart phone applications users share their vacation experiences with their photographs and comments, they leave a certain amount of impression on people (Xiang and Gretzel, 2010; Fadare et al., 2013). Price and Starkov (2006) found in their research that some hotel companies have promote reward giving offers to the visitors who write entries or comments on their hotel blogs. Mobile applications has a huge impact in social media marketing. With the rapid development of mobile computing technologies, various kinds of mobile applications have become very popular (Gavalas and Economou, 2011). There is a flourishing field of academic studies concerning the impact of mobile technology on the tourist experience (e.g. Kramer et al., 2007; Kim et al., 2008; Rasinger et al., 2009; Tussyadiah and Zach, 2012). Gretzel and Jamal (2009) pointed out that in addition to occupying the role of functional devices,

Information Communication Technology have become essential features of the creative lifestyle and experiences of contemporary tourist consumers on site. Technologies such as mobile devices, are these days as transportable smart computers, and have become part of our life styles (Wang et al., 2012). Furthermore, Neuhofer (2014) notes that, the key trend indicates that technology co-creates and enhances tourist's experiences. In the very near future these mobile devices technology will create a whole range of new tourists' experiences (Gretzel and Jamal, 2009). Although other researchers have published papers on co-creation tourists, experiences as well as technology enhanced experiences in the past years, (Neuhofer, 2014). Empirical research suggests that mobile services companies often use two strategies to increase customers' retention: first, increasing customer satisfaction so that customers are willing to stay; and second, making any switch or defection difficult for the customer by increasing or developing switching barriers (Jones et al., 2000; Balabanis et al., 2006). However, despite the popularization of the mobile devices, there is scarce research on customer satisfaction and customer retention in the services market (Gerpott et al., 2001). In this context, the present study proposes an integrated approach to classify the service quality. The study also improves the customer satisfaction in mobile tourism applications, and

further examine the formation of customer satisfaction in the Korean mobile tourism applications.

## 2.2 Integration of Kano and AHP

Recent studies have combined the Kano model with AHP analysis and the resulting integrated model is suitable for the systematic analysis of service quality. Li et al. (2009) used this integrated model to analyze customer requirements and illustrated the effectiveness of this model by case study. Alroaia et al. (2011) analyzed the importance of e-banking service factors on customer satisfaction through the combined Kano model and AHP. Hemati and Ghorbanian (2011) applied the hybrid Kano-AHP model to transportation service elements and ranked the service factors for customer satisfaction. Alroaia and Ardekani (2013) analyzed customers' needs of e-banking services and prioritized the service factors for effective service operations through a combination of Kano model and AHP. The authors analyzed the data collected from 454 respondents across 18 questions and provided the classification and prioritization of e-banking service factors. Kazemi et al. (2013) identified the service factors of e-banking services using Kano model and AHP. They proved that the results of the Kano model and AHP are similar and that each method complemented the other. Momani et al. (2014)

suggested the integrated model with Kano and fuzzy AHP to derive strategies for the healthcare industry. As healthcare services get increasingly more critical, it is necessary to analyze service elements systematically for effective strategy formulation.

Bauk (2015) examined the customers' satisfaction on e-learning service in a blended environment. The Kano model employed to analyze customers' service quality needs. Huiskonen and Pirttilä (1998) analyzed and classified the customer service requirements for logistics using the Kano model and recommended the important factors that logistics service providers should focus on. Tan and Pawitra (1998) developed an

integrated model of SERVQUAL and Kano to manage service quality. Applying this model to a case study, they evaluated service quality and proposed improvement strategies. Kuo (2004) applied the Kano model to web-community service quality, and identified and prioritized 29 service quality elements. Nilsson-Witell and Fundin (2005) analyzed service quality using the Kano model and focused on the attractive quality. Mikulic and Prebezac (2011) reviewed the application of the Kano model to service quality, analyzed the pros and cons of this model, and proposed a modified Kano approach. The previous researches on integration of Kano model and AHP (See Table 1.)

<Table 1> The Previous Studies on the Integration of Kano and AHP

Researcher	Contents
Ozgen(2008)	Integrating the Kano Model AHP and planning: QFD application in library service
Li et al.(2009)	An integrated method of rough set, Kano's model, and AHP for rating customer requirements' final importance.
Lee et al.(2011)	Requirements Management Using KANO Model and AHP for Service Systems Design
Alroaia(2011)	Priority of factors Affected on customer's satisfaction in the e- banking by using Kano model and Analytic Hierarchy Process: A case of Iranian Commercial Bank.
Shaheen et al.(2012)	The combination of clustering methods, AHP and Kano to describe the services of Saman Bank case study
Kazemi(2013)	Prioritizing factors affecting bank customers using Kano model and Analytic Hierarchy Process.
Wang(2014)	Combining Fuzzy AHP and Fuzzy Kano to optimize product varieties for smart cameras: A zero-one integer programming perspective.
Momani et al.(2014)	Classifying and Ranking Healthcare Quality Attributes Using integrated Kano-Fuzzy Analytic Hierarchy Process.
Mohammat(2016)	The Application of Integration of Kano's Model, AHP Technique, and QFD Matrix in Prioritizing the Bank's Substructions.
Park et al.(2016)	Analysis of Importance of Lighting Factors through Kano Model and AHP

### III. Research Approach and Methodology

#### 3.1 Research Approach

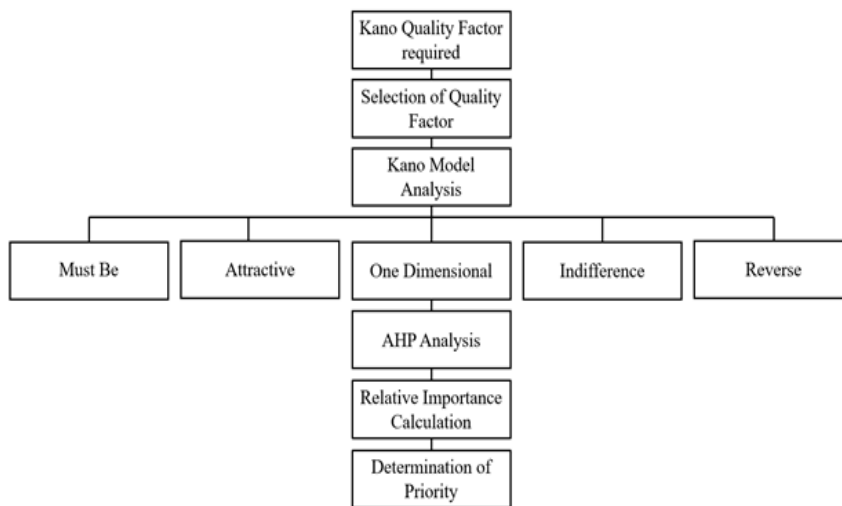
The goal of this research is to present an improved research approach according to Kano's framework to measure customer's service requirements in mobile tourism applications. All the stages of the research are in as the Figure 2.

There are three main steps conducted mainly in this research. First, we identified the customer service requirements in mobile tourism applications. Second, we measured customer satisfaction using Kano and classified them into Five Groups: Must-be; Attractive; One-Dimensional; Indifferent; and Reverse. Third, we ranked customer service requirement

in order of importance using AHP to prioritize the most important service requirement based on expert opinions. Carefully, keeping in mind the goal of this study, we considered the customer's preference in the mobile tourism applications as the very important factor, for instance this study found that Geolocation map service and the Multilingual services as the most important requirements in mobile tourism applications.

#### 3.2 Research Methodology

To achieve the research purpose, we analyzed the priority of service quality factors using the integrated Kano Model and AHP. First, we identified 17 service requirements and we categorized them into five main criteria of service requirements: content management services, location based services, mobile



<Figure 2> Stages of the Research

<Table 2> Tourism Applications Service Requirements

Main Criteria of Service Requirements	Sub Criteria of Service Requirement
Content management services	1. Multimedia information 2. Recommendations for personal routes
Location based services	3. Geo-location map 4. Geo-location audio tours 5. Augmented reality
Mobile wallet	6. Mobile payment 7. Mobile ticketing 8. Loyalty cards, coupon and voucher
Social	9. Integration with TripAdvisor 10. Virtual postcards social sharing 11. Geo-location social sharing 12. Travelogue
Accessibility and usability	13. Free download 14. Multilingual option 15. Service available off-line 16. Friendly and efficient user interface 17. Compatibility with different operating systems

wallet, social, accessibility and usability. Table 2 shows the service quality criteria and sub criteria. We conducted the Kano questionnaire by using the service requirements identified by the users through focus group study. We classified each requirements using Kano model and divide them into the five groups on their impact on customer satisfaction (must-be, one-dimensional, attractive, indifferent, and reverse). Secondly, we conducted AHP questionnaire on the experts based on the result we got from Kano. Then, we calculated the relative importance of all the requirements in the same category using AHP method. We conducted survey both online and offline. We visited tourism spot in Gyeongju area to

conduct the survey specifically on tourists who were experienced in using mobile tourism applications. The Kano survey was conduct between October 2016 and November 2016. The majority of the respondents were young college student age between 21 to 30 years of age. Finally, we used 147 respondent's survey result as the valid questionnaires to conduct the further research. In AHP, the consistency ratio is defined as CR where  $CR = CI/RI$ . Saaty (2012) has shown that a consistency ratio (CR) of 0.10 or less is acceptable to continue the AHP analysis. Since, we have CR of less than 0.02 therefore it is applicable to conduct the further research with existing survey.



## IV. Research Design and Analysis

### 4.1 Research Design

Prior to distributing the questionnaires to the tourists, we held 5 focus-group interviews (in groups of 5 people) and 10 unstructured interviews with tourists. The subjects had experience with mobile tourism applications. The focus group meeting began with the respondents answering the questions formulated by Shiba et al.(1993) using their previous experiences as a mobile tourism application user. Using the answers and the debate, we found seventeen expected features, which then grouped into five main criteria, as shown in Table 2 (Content management services; Location-based services; Mobile wallet; Social; Accessibility and usability).

### 4.2 Sampling Design and Data Collection of Kano

After the process of identifying the requirements, questionnaire was prepared. Later, through Kano questionnaire, we determined which one of these requirements to categorize under Must-be, One-dimensional, Attractive and Indifferent. The questionnaire consisted of two sections, in first section, (gender, age, place of origin, qualification, mobile device operating system, and mobile

application experience). In second section, there were 34 questions to investigate the 17 requirements.

We administered 147 questionnaires to a sample of tourists visiting South Korea and Koreans who uses mobile applications in assisting travel related task on their mobile phone. The first round of questionnaires was administered both online and offline. Then, we conducted offline through printed form over a period of 2 months: October to November 2016. After screening the collected questionnaires, 147 questionnaires (out of 156) were valid (96%). The sample consisted of tourists from different part of the world, though the majority of the respondents were Korean who have experience in using mobile tourism applications, 14.3% were Chinese, 10.2% American, 6.8% Canadian, 4.1% United Kingdom, 2.0% French, 2.7% Indian and 4.1% Shrilankan, 55.8% were Koreans. As for gender distribution, 52% of the respondents were male, and 48% were female.

The average age of the respondents was between 21 to 30 years old which consist of 79.2% of the total population. In terms of educational qualification, most of the respondent were undergraduate which consists of 57.8%. The next is postgraduate students, which consist of 25.9%. Among the mobile device owners, 84.4% of respondents have downloaded and experienced at least more than one mobile applications. Most of the respon

<Table 3> Sample Demographics

Category		Frequency	Percentage %
Gender	Male	81	52.60%
	Female	66	42.90%
Age	Less than 20	6	3.90%
	21 to 30	122	79.20%
	31 to 40	11	7.90%
	41 to 50	5	3.20%
	51 to 60	3	1.90%
Educational Qualification	High School	14	9.50%
	Under Graduate	85	57.80%
	Post Graduate	38	25.90%
	PhD	10	6.80%
Nationality	Korean	82	55.80%
	Chinese	21	14.30%
	American	15	10.20%
	Canadian	10	6.80%
	United Kingdom	6	4.10%
	French	3	2.00%
	Indian	4	2.70%
	Srilankan	6	4.10%
Mobile Operating	Android	85	57.80%
	IOS	57	37%
	Window	5	3.20%
Experience in Using	Yes	130	84.40%
	No	17	11%

dent uses travel applications such as Korail, Airbnb, Trivago, TripAdvisor, etc. Based on the survey result, 57.8% of users use Android (Samsung, LG etc.…) device, 37% of user’s use IOS device(iPhone) and the rest of 3.2 % uses windows operated device as shown in Table 3.

### 4.3 The Results of Kano

Following the data collection, we proceeded to classify each requirement. The output of this classification might prove to be particularly

relevant for tourist app developers because it allows them to establish a difference between each requirements. It could then be useful to design the mobile applications according to the tourists’ needs and desires, thus helping to achieve higher levels of customer satisfaction. We calculated using frequency method to the total number of responses for each requirement, using the Kano evaluation matrix Figure 3. It helps identify each service requirements to categorize under Kano categories. We evaluated the result by using frequency method. In which we determined the

<Table 4> Requirements by Frequency

Service requirement	M	O	A	I	R	Q	Total	Category
Content management services								
1. Multimedia information	23	13	52	56	0	3	147	Indifference
2. Recommendations for personal routes	8	25	75	36	1	2	147	Attractive
Location based services								
3. Geo-location map	33	47	29	35	2	1	147	One dimensional
4. Geo-location audio tours	11	15	61	51	4	5	147	Attractive
5. Augmented reality	2	6	74	55	8	2	147	Attractive
Mobile wallet								
6. Mobile payment	18	27	47	48	5	2	147	Indifferent
7. Mobile ticketing	14	38	64	27	1	3	147	Attractive
8. Loyalty cards, coupon and voucher	10	37	67	26	3	4	147	Attractive
Social								
9. Integration with TripAdvisor	17	35	43	46	2	4	147	Indifference
10. Virtual postcards social sharing	3	10	36	89	6	3	147	Indifference
11. Geolocation social sharing	8	15	50	64	7	3	147	Indifference
12. Travelogue	5	21	64	7	3	147	147	Attractive
Decision Hierarchy for Service Requirements Classification								
13. Free download	13	43	49	38	0	4	147	Attractive
14. Multilingual option	15	46	43	29	1	13	147	One dimensional
15. Service available off-line	5	40	61	35	1	5	147	Attractive
16. Friendly and efficient user interface	18	42	44	37	3	3	147	Attractive
17. Compatibility with different operating systems	28	48	24	41	3	3	147	One dimensional

different categories of the requirements based on the maximum frequency obtained, as shown in Table 3 the questionable results had very low frequencies. Therefore, the questionnaire can have had a high level of reliability. First, there were three requirements in one-dimensional. The first one-dimensional requirement is a Geolocation map service. This feature runs on GPS-enabled mobile devices and provides a richer experience than could be received on a desktop PC because the data sent and received change as the physical location of the tourist changes. Geolocation maps allow real-world locations (such as restaurants, museums, and events) to be related to the

users' location, meaning that the user can receive location-aware offers. Geo-location maps are ideal tools for guiding tourists through unfamiliar environments, showing roads and directions to show pedestrian, and car navigation. Another one-dimensional requirement is the Multilingual Option and Compatibility with different operating systems. Multilingual Option offers a great comfort for the tourist when it comes to travelling. In addition, Compatibility with different operating system is also very important features; the difference in the operating system could create difficulties in installing an app if the device does not go compatible with the operating

system. The results also show that tourists consider nine requirements attractive. Tourist app developers should give importance on developing these requirements in the tourism applications, since the presence of these service requirements strongly increases the customer satisfaction. These kinds of requirements are useful for differentiating mobile applications from its competitors, to increase the perceived value of the app, and to improve the travel experience. The first attractive requirement is the ability to receive recommendations for personal routes, including the ability to create a customized city tour (e.g. own interests, available time, trip length, visit type). The second attractive requirement is geo located audio tour service, which allows audio guides containing detailed information about the tourist's destinations, and the third is the augmented reality. Augmented reality is a disruptive technology that will influence almost every aspect of our technological life. It based on the integration of digital 3D content into the real world. Augmented reality applications aimed at tourists will enrich the real world with interactive virtual information that allow visitors to taste the new dimension of technology in tourism experience which helps discover new places and easily find the places they want to look for and also to learn more about their surroundings.

Augmented reality is a key tool for implementing the futuristic idea of the Internet

of Things a term originally proposed in 1999 by Kevin Ashton to refer to a world of networked smart objects. As a means of highlighting interesting features or of bringing history to life, augmented reality has great potential in the travel sector. It can deliver vast quantities of location-based information to visitors, as well as virtual tour guides and convincing interactive previews of the tourist attractions. The fourth attractive requirement is mobile ticketing. Mobile ticketing allows buyers to buy transport tickets through mobile devices, and receive a virtual boarding pass for a public transport system. The fifth attractive requirements are Loyalty cards, coupon, and voucher. This service offers possibility of storing, updating, and managing digital loyalty cards, coupons, and vouchers directly on the smartphone through a mobile wallet. The sixth attractive requirement is travelogue, travelogue allows user to keep their travel record and cherish moment on click on their smartphone. The seventh attractive requirement is free download service. It allows user to download applications for free many users are not willing to pay for an app where they can find alternatives without the payment. On the other hand, people are not willing to pay for a mobile application for travel and tourism if they do not know its value and usefulness in advance. The eighth attractive requirement is free offline availability: this feature guarantees the use of app even if there is no Wi-Fi

connection. This requirement is very important for foreign tourists who usually do not have a subscription to Korean Internet service providers. The final attractive requirement is friendly user interface. This requirement allows user to use app function smoothly without any interference and difficulties. We found five indifferent requirements. The first of these were Multimedia Information, the option to download multimedia information about places to visit (such as ongoing and planned exhibitions, announcements, events, timetables with scheduled events, and explanatory information about monuments and artworks). Three of indifferent requirements related to the social networking were, Integration with TripAdvisor, Virtual postcards social sharing, and Geolocation social sharing. This indicates that, tourists are not interested in sharing virtual postcards and their location, within their social networks. These requirements can be attractive requirements in several more years.

The last indifferent requirements are mobile payment. This requirement gives users the opportunity of using the mobile device as a credit or debit card and it is the mobile wallet. The result indicates either that people are still not familiar with this service or do not trust mobile commerce sufficiently enough yet. Nevertheless, according to several studies, mobile payment represents a promising and profitable future for mobile technology. Therefore, it is wise to think about the

indifferent attributes as well. Applications developers should not invest in fulfilling reverse and questionable requirements; because these have no impact on customer satisfaction, rather these requirements develop dissatisfaction. By considering the frequencies of the results and by applying the hierarchical M>O>A>I rule, some practical indications emerge. If tourism application developers wish to develop a mobile application to improve the customer satisfaction, then consideration of must be, attractive, and one-dimensional are keys for the success of achieving high customer satisfaction.

#### 4.4 Analytic Hierarchy Process (AHP)

One of the main limitations of the M>A>O>I rule is that it does not allow a hierarchical order to be defined within the same category. For this reason, having grouped the requirements into the five clusters identified by Kano, we used AHP to explore the hierarchical order among the requirements in the same category (must-be, one-dimensional, attractive). We did not consider indifferent and reverse requirements, since the Kano does not recommend this implementation. We calculated the importance value and the pairwise comparison of the selected requirements identified in the problem definition. In the AHP questionnaire, we asked five experts to assign an importance value for each

<Table 5> Kano and AHP Questionnaire

Schemes	Corresponding questions	Scales	Respondents
Kano	How do you feel about X if it is fulfilled? How do you feel about X if it is unfulfilled?	Linguistic (5-point)	Customers
AHP	How much degree is X1 preferred to X2?	Numeric (9-point)	Experts

requirement, on a scale of 1 (some importance) to 9 (extremely importance). A pairwise comparison between all requirements belong to the same category was then carried out. The main differences between the Kano questionnaire and the AHP questionnaire are summarize in Table 5.

#### 4.5 AHP Survey

The technique of analytic hierarchy process is used to prioritization of criteria. Therefore, the population include of experts and masters in that field of study. According to Saaty (1989), number of expert must be between 5 to 10 persons; therefore we conducted AHP questionnaire on 5 experts. We administered 5 questionnaires by email to experts from Three University Professors in South Korea. We used *Expert Choice* and *Excel* to evaluate the collected survey data. All the questionnaires were valid after screening the collected questionnaire as shown in table 10 with each individual's overall consistency level less than 1. Having completing the Individual Consistency of each attributes, we calculated the mean of the entire participant and rounded them into integer. If mean value is between

(-1.5 to +1.5=1). The pairwise comparison of overall geometry mean in each category (one-dimensional, attractive and Indifferent). AHP (Analytic Hierarchy Process) allows the calculation of each requirements in the same quality categories in a ranking. The overall priority represents the relative importance of each characteristics. So that, it is possible to order the requirements in same quality categories, based on the individual value. Moreover, the number shows the relative importance of the two requirements (for instance, value 4 for the pair Geolocation map and compatibility with different OS (Operating System) means that Compatibility with different O.S. is 4 times more important than Geo Located Map.)

#### 4.6 The results of AHP

Based on Analytic Hierarchy Process, we calculated the weights of each requirement and the final weighted order of the requirements for mobile tourism applications, using expert choice software. This is shown in Table 6 since, we have first used Kano to classify the service requirements and based on the Kano, 'Must be' is the most important requirement,

<Table 6> Hierarchical order among requirements derived from Kano and AHP

Categories	Service Requirements	Weight	Rank
O	Geo-location map	0.444	1st
	Multilingual option	0.444	1st
	Compatibility with different operating systems	0.111	2nd
>			
A	Mobile ticketing	0.192	1st
	Loyalty cards, coupon and voucher	0.192	1st
	Augmented reality	0.172	2nd
	Recommendations for personal routes	0.165	3rd
	Service available off-line	0.038	4th
	Friendly and efficient user interface	0.038	4th
	Travelogue	0.036	5th
	Free download	0.036	5th
	Geo-location audio tours	0.03	6th
>			
I	Mobile payment	0.472	1st
	Geolocation social sharing	0.233	2nd
	Multimedia information	0.155	3rd
	Integration with TripAdvisor	0.07	4th
	Virtual postcards social sharing	0.07	4th

followed by One-dimensional, Attractive, Indifferent, Reverse and Questionable. Considering the M>O>A>I rule we have calculated the weight among each service requirements. The result shows that in one-dimensional, first we have Geolocation map service and multilingual option both having the same priority of 0.444 or 44% each. Which means that the costumers consider both of them equally important. However, the tourism application practices these two services in mobile tourism applications but the problem in the Geolocation map lies in inaccuracy or the lack of prompt updates. There is still a lot of issues with the precision of the Geolocation map services in Korea. Therefore, it is

important to improve Geolocation services, as it will help tourists to find nearby hotels, cafes, and places of interest upon arrival to destination point and take their bearings in the locality later. It has high potential to create the best of travel experiences and to make use of the developed technologies around us. Since, many of the costumers also prefer multilingual option as an important requirement. Application developers must not ignore the fact that fulfilling these requirements will not only improve the customer satisfaction but also benefit the business as well. Second most important requirement is compatibility with other operating system. It has a weight of 0.111 or 11% in one-dimensional category.

Among attractive requirements, mobile ticketing and loyalty card, coupon and voucher has the highest weight of 0.192 or 19% each therefore, both were in 1st rank. Next, augmented reality obtained (0.172 or 17%, 2nd rank). Recommendation for personal routes obtained weight of 0.165 or 16% of importance and it ranked 3rd. In 4th rank, Service available off-line and Friendly and efficient user interface has priority weight of 0.038 or 0.3% of importance. Then on 5th rank, Travelogue and Free download service each has priority weight of 0.036 or 0.4% of importance. Finally, on the 6th rank we have Geolocation audio tour service, it obtained priority weight of 0.030 or 0.3% of importance. Five service requirements were under Indifferent category.

First is mobile payment with 0.427 or 42% of importance, since it is the highest among the Indifferent category therefore, it ranked 1st. In 2nd rank, we have Geolocation social sharing with weight of 0.233 or 23% of importance. The next is multimedia information with priority weight of 0.155 or 15% importance. Finally, in the 4th rank, integration with the tripadvisor and the virtual post cards social sharing has priority weight of 0.070 to 0.7% of importance.

## V. Conclusion

### 5.1 Summary of the Research

The concept of tourism dated back to the ‘Sumerian Renaissance’ meaning dating back to the BCs. Since, the evolution of tourism trend is changing from time to time and now a day, advance in the technology is at its rapid speed. Therefore, especially in terms of mobile technology there is very high potential to provide the personalized, easy to carry around and connect to the millions of information in the mobile device. Since, we are living in the age of technology, it is very important to know what costumers requires in their mobile tourism applications and this study focus on providing the needs of the customers in mobile tourism applications. This, study focuses not only on improving the customer satisfaction in mobile tourism applications but also on classifying the customer requirements and categorizing them based on the importance in hierarchical order.

### 5.2 Practical Implications

The main managerial implication of this study is the proposal of a simple and practical approach useful to identify and order the service requirements. In addition, analysis result can provide some practical hints on how to develop a customer oriented mobile tourism



applications. In order to improve the customer satisfactions, tourism application developers must first ensure the presence of the One-dimensional requirements. Once, the one-dimensional requirements have been fulfilled, application developers should then focus upon providing the attractive requirements. If additional resources are available, then it is advisable to consider the presence of indifferent requirements. However, indifference requirement, according to the Kano model means, these attributes refer to aspects that are neither good nor bad. They do not result in either customer satisfaction or customer dissatisfaction. For example, thickness of the wax coating on a milk carton. This might be key to the design and manufacturing of the carton, but consumers are not even aware of the distinction. We think that the service requirements that are under the indifference could be in either one dimensional or attractive in future study. Though the result showed that these social network related service for instance, Integration with TripAdvisor, Geolocation social sharing and Virtual Postcard Social sharing were preferred as indifferent. This could be due to sample size and sample demographics. These implications were due to the results of the unique situation in the mobile tourism application users in South Korea. The above-mentioned practical implication could be helpful to the tourism application developers in South Korea. These

could meet the requirements of the costumers to experience the best of their travel experiences in South Korea. Perhaps, this study could also be helpful to application developers and the costumers outside Korea despite the big cultural and geographical difference. Since, tourism has a very similar trend and needs for every tourist.

### 5.3 Academic Implication

This paper provides huge research contribution in the field of tourism. The main research implication of this study is the proposal of a simple research approach. An approach useful to identify and order the requirements in a product or a service according to the drivers of customer satisfaction. The use of Kano Model and AHP as methodology will provide a good literature and guidance for future study as well. The participants in focus group study revealed service requirements in the mobile tourism applications. Which can only stem from this research work such as mentioned earlier in Table no. 2. Application developers and academicians can also use this research as a guidance for the future study in tourism service requirements. This research provides meaningful managerial implications in classifying and evaluation of service requirements in mobile tourism applications. Since, these service requirements in mobile

tourism applications are identified through the focus group study. We were able to classify and categorize 17 service requirements with help of kano model. Finally, AHP helped us rank these classified service requirements in priority order. The special about AHP is that we conducted the test with experts in the tourism field. Therefore, this study brings uniqueness and makes an academic contribution. The research not only include tourism application users but also experts. The research and academic implications of this research can provide some of the directions, and literature for the future research.

#### 5.4 Limitations and Further Study

Although this study may bring benefits and new business opportunities to the tourism sector, there are several challenges and constraints that need to be coped with, the application developers should include a wide variety of heterogeneous and diversified services but this could be a barrier to implementation. One of the main limitation of this study is the sample size, if the sample size is bigger and diverse the result could have been a little different. So in future research, we will consider bigger sample size and more diverse population sample from various tourism spot in Korea.

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동국대학교 일반대학원 경영학 석사학위를 취득하고 현재 동 대학원 국제비즈니스협동과정 박사과정에 재학 중이다. 주요 관심분야는 스마트관광, 소셜미디어 등이다.

#### 이 영 찬 (Lee, Young-Chan)



서강대학교 경영학사, 동 대학원에서 경영학 석사 및 박사학위를 취득하였다. 현재 동국대학교 경주캠퍼스 경영학부 교수로 재직하고 있으며, *Annals of Management Science*, *The Open Operational Research Journal*의 Editorial Board, 한국경영학회 MIS 분야 대표 편집위원으로 활동 중이다. 주요 관심분야는 기업성과측정, 데이터 마이닝, 복잡계 이론, 다기준 의사결정 등이다.

<Abstract>

## **Classification and Evaluation of Service Requirements in Mobile Tourism Applications Using Kano Model and AHP**

Tenzin Choedon · Lee, Young-Chan

### **Purpose**

The emergence of mobile applications has simplified our life in various ways. Regarding tourism activities, mobile applications are already efficient in providing personalized tourism related information and are very much effective in booking hotels, flights, etc. However, there are very few studies on classifying the actual service requirements and improving the customer satisfaction in mobile tourism applications. The purpose of this study is to implement a practical mobile tourism application. To serve the purpose, we classify and categorize the service requirement of mobile tourism applications in Korea. We employed Kano model and analytic hierarchy process (AHP). Specifically, we conducted a focus group study to find out the service requirements in mobile tourism applications.

### **Design/methodology/approach**

The data for this study were collected from Koreans and Foreigners who has the experience using mobile tourism applications. Participants needed to be familiar with mobile tourism applications because such users may be more aware of the mobile tourism applications services. We analyzed 147 valid data using Kano model and conducted AHP analysis on five experts in the field of tourism using *Expert Choice* software.

### **Findings**

In this paper, we identified the 17 service quality requirements in the mobile tourism applications. The results reveal that the service requirement such as Geo-location map, Multilingual option, Compatibility with different operating systems were unavoidable service, absent of such requirements leads to the dissatisfaction. Based on the results of the integrated application of both Kano model and AHP analysis, this study provide specific implications for improving the service

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quality of the mobile tourism applications in Korea.

**Keyword:** Mobile Tourism Applications, Kano Model, Analytic Hierarchy Process, Customer Satisfaction, Tourist Experience Evaluation, Customer Service Improvement, Service Classification

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