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Winter 12-5-2005

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Abstract: Designing mobile services is fundamentally different than designing online services. Not only are there differences in underlying technologies, but also in the way people use services. If these differences are not taken into account, mobile services are likely to fail. If mobile services do not deliver what people want, these services will fail no matter how excellent the underlying technology is. The user interface design that is commonly used in mobile services is based on multi-layered approach, which is not very user friendly. So a well designed single layered user interface will be more user friendly than the conventional one and it will be having edge over others. However, it is quite difficult to provide a single layered user interface in a small screen. This study aims at examining how user interface design attributes of mobile services affect customer preferences. In order to explore customer preferences to each design attribute, we measure customer's WTP (Willingness To Pay) toward different interface designs.

I. Introduction

In Korea, the phenomenal growth of ownership of cellular phones was not a government initiative, rather a private industry-driven one. As the user population of the high-speed Internet service is growing quickly in Korea, many users are more inclined to use the Internet for multimedia entertainment, With the rapid increase of the internet usage, the growing penetration of wireless devices, and the rapid technological innovation, wireless technology shifts the world of wired Internet to the wireless mobile Internet.

The Internet has provided an easy and effective way of delivering information and services to millions of users who are connected to a wired network. Evidently, this wired network addresses two major constraints: time and place. These limitations have raised the issue of the mobile internet, which enables users to access information from any place at any time. The mobile Internet is expected to deliver great time and place flexibility to individuals.

This study aims at examining how user interface design attributes of mobile services affect customer preferences. In order to explore customer preferences to each design attribute, we measure customer's WTP (Willingness To Pay) toward different interface designs.

II. User Interfaces of Mobile Services

The user interface and the size of mobile devices are the main concerns in design of mobile services. With the advancement in semiconductor technology, the size of mobile devices has reduced a lot. We can actually reduce it further by making a touch screen based user interface because it will avoid the need of physical keypad that takes a lot of space. The other important concern in the design of mobile devices is the User Interface (UI) because it is the one with which users have to interact all the time. The user interface design that is commonly used in mobile services is based on multi-layered approach, which is not very user friendly. So a well designed single layered user interface will be more user friendly than the conventional one and it will be having edge over others. However, it is quite difficult to provide a single layered user interface in a small screen.

III. WTP (Willingness to Pay)

To measure WTP, there are two methods: contingent method and conjoint method. In the contingent method, arbitrary goods or service are presented with specific prices, and then respondents take or reject the offers. While the contingent method asks respondents to evaluate real products, the conjoint method asks them to evaluate hypothetical products. The conjoint method allows researchers to presents respondents with a choice set that contains several alternatives that vary along several attributes, including price. Respondents decide the rankings among the alternatives. Based on the rankings, researchers can analyze the preferences and utilities of respondents for specific goods/service. The major objective of this study is to examine impacts of rich interaction design features of mobile services on customer preferences. To investigate customer preferences, it collects respondents' WTP to specific interface designs of mobile services. To analyze the WTP data, it uses the conjoint method.

IV. Research Methodology

The main purpose of this study is to explore the effects of design attributes of mobile services on WTP. In order to analyze relative impacts of interface deign attributes on customers' preferences, this study employs conjoint analysis. A conjoint analysis is one of the most widely-used

methods which are designed to analyze consumer needs. This method shows relative importance of various utilities considered by consumers when they purchase service and a service that consists of the most ideal combination of those utilities. Conjoint analysis originates from mathematical psychology. Conjoint analysis is used to understand how consumers develop preferences for products or services, which encompass, as usual, multi-attributes and multi-attribute levels. Utility is a consumer's subjective measurement of preference that is evaluated for each level of attributes. The utility values associated with each level of attributes are summed as the overall utility. Then, products or services with higher utility are assumed to be of a better choice for consumers. In order to apply the conjoint analysis into this research, we go through the following steps.

Step 1: Specifying Factors and Levels

Based on expert interview, we find that the interface design of mobile service is very critical to attract mobile customers. Wireless Application Protocol (WAP) phones are a growing relevant part of mobile services. In order to use WAP based services, users explore a menu hierarchy. The positions of specific mobile services within menu and the amount of their information within menu affect customer purchase decisions. Table 1 shows different levels of menu design attributes of mobile service. In this study, we examine how the menu design attributes affect customer's WTP.

Table 1. Design Attributes of Menu Design in Mobile Services

Menu Design Attributes	Levels
Mobile service type shown in menu	Entertainment Service
	Information / Communication Service
	No Information about Mobile Service Type
Payment information of mobile serive shown in menu	Cash Discount Information shown in menu
	Coupon Information shown in menu
	No Information about payment shown in menu
Menu position of mobile service	First Line
	Second Line
	Middle Line
Recommendation information about mobile services shown in in menu	Log Data Based Recommendation
	User Evaluation Based Recommendation
	No Information

Step 2: Choosing a Presentation Method

Since this study has four attributes with three levels each, all possible hypothetical products are 81 (3*3*3*3). If we use a full-profile method, respondents would have difficulty in answering all 81 questions. For this reason, the number of questions is needed to be diminished to a proper level. As an alternative to a factorial design, we use a fractional factorial design. This approach is a way to reduce the number of questions. The number of initial questions (81 questions) is reduced to 9 questions (refer to Table 2). Based on the fractional factorial design, 9 hypothetical products are generated.

Table 2. Hypothetical Products

Product	Mobile Service Type	Payment Information	Menu Position of Mobile Service	Recommendation Information About Mobile Service
P1	No Information	No Information	First Line	User Evaluation Based Recommendation
P2	Entertainment	Coupon	Middle Line	User Evaluation Based Recommendation
P3	No Information	Cash Discount	Middle Line	No Information
P4	Information /Communication	Cash Discount	Second Line	User Evaluation Based Recommendation
P5	Information /Communication	No Information	Middle Line	Log Data Based Recommendation
P6	Entertainment	Cash Discount	First Line	Log Data Based Recommendation
P7	Entertainment	No Information	Second Line	No Information
P8	Information /Communication	Coupon	First Line	No Information
P9	No information	Coupon	Second Line	Log Data Based Recommendation

Step 3: Selecting a Measure of Consumer Preference

Based on 9 hypothetical products, we design a menu screen. In order to measure customer preferences to specific hypothetical products, the study employs the rank-order method, rather than the rating method. Respondents are asked to provide the maximum monetary amounts that they would pay to get these products. Based on the amounts, we investigate how much each menu design attribute of mobile services affects customer's WTP.

Table 3. Part-Worths and Relative Importance

Attribute	Part-Worth			Relative Importance (%)
	1	2	3	
Mobile Service Type	Entertainment	Information /Communication	No Information	27.51
	1.74	0.32	0.94	
Payment Information of Mobile Services	Discount	Coupon	No Information	26.53
	1.54	0.96	0.50	
Menu Position of Mobile Services	First Line	Second Line	Middle Line	23.21
	1.20	0.48	1.33	
Recommendation Information of Mobile Services	Log Data Based Recommendation	User Evaluation Based Recommendation	No Information	22.75
	0.85	1.16	0.99	

V.   Data Analysis

We interviewed 150 respondents, consisting of 86 males and 64 females. Since most of wireless internet users are

younger, most of respondents consist of 12-19 year olds in this study. In addition to portraying the impact of each level (entertainment, information/ communication, no information et. al) with the part-worth estimates, conjoint analysis can assess the relative importance of each design factor (information about mobile service type, payment information of mobile service, position of mobile service, and recommendation information about mobile service). Since the part-worth estimates are on a common scale, the greatest contribution to overall utility of preference, and hence the most important factor, is the factor with the highest range of part-worths.

In this study, we examine the relative impacts of menu design attributes of mobile services on customer's WTP. We try to find an optimal menu design of mobile services that high-valued by users. Table 3 reports the means of the part-worths and relative importance for 150 subjects. The greater the relative importance, the more an attribute influences your preferences for mobile services. If the information about mobile service types is shown in menu, there is the highest possibility that customers purchase mobile services (27.51%). In other words, customers utilize information about mobile service types as critical information in purchasing of mobile services. The second influential menu design attribute is the payment information

of mobile services shown in menu, (26.53%), the third is the positions of mobile services within menu (23.21%), and the last is the recommendation information of mobile service.

VI.   Conclusions

One often meets the argument that due to the complexity of the service model and the convergence of technologies and services expected in mobile services, it is very little relevant research available to help us understand the mobile services and their users. The main purpose of the study is to explore attributes that influence customers' preferences to mobile services. To explore the relative importance of the attributes, the study uses conjoint analysis. It finds that the most influential attribute is the mobile service types. This finding supports the current phenomenon that the main usage of mobile services is concentrated on entertainment services. Although this study tries to understand customers of mobile services empirically, it has very limited contributions to theoretical development.   In addition, regarding to the relationships between attributes of mobile services and customers' preferences, it does not propose a theoretical explanation.