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A Study of Mobile Internet Usage from Utilitarian and Hedonic User Tendency Perspectives

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ABSTRACT

Although a few studies have focused on mobile value from the distinctive feature of a wireless mobile technology perspective, limited attempts have been made to study mobile value from a mobile application perspective. Thus, in this study we elaborate on mobile application as two types of values: utilitarian and hedonic. Based on these two values, we conceptualize two types of mobile value tendency: utilitarian tendency and hedonic tendency. The goal of this study is to examine the relationships between mobile users' value tendency and their personal predispositions (i.e., socio-economic status and level of maturity) and their perceptions on mobile Internet service quality dimensions (i.e., connection quality, design quality, and information quality).

Results of the study show that mobile users of lower maturity level are more likely to have hedonic tendencies than those of a higher maturity level, who in contrast exhibit more utilitarian tendencies; the mobile users' hedonic tendency is positively associated with their perceptions on mobile Internet service quality. However, unlike our expectations, mobile users' socio-economic status is not related to their utilitarian tendency of mobile Internet use; the mobile users who have a higher level of utilitarian tendency are more likely to show negative perception on mobile Internet service quality. The interpretation of the unexpected results, research contributions, and limitations are discussed.

Keywords

Mobile Internet, Mobile Values, Utilitarian Tendency, Hedonic Tendency, Mobile Internet Service Quality Dimensions,

INTRODUCTION

The Yankee Group (Yankee 2003) predicts that the global wireless Internet service market will continuously increase at the average annual growth rate of 37.1% from the year 2002 to year 2007. According to the prediction on the future of mobile/wireless computing by Martin Cooper, the CEO of ArrayComm Inc¹, "The future of mobile/wireless computing over the next 10 years will include the replacement of tethered Internet connections with the freedom of mobility -- high-speed wireless Internet capabilities will soon become a staple for every worker, just as cellular phones are part of our lives today." Recently, the UMTS forum (UMTS 2005) forecasts that the total global number of mobile voice subscribers will range from 1.7 to 2.6 billion in 2010 and mobile data network subscribers will reach between 600 and 800 million for the same year. More recently, a UK-wide Wi-Fi network plan² has been unveiled that will give residents in the UK's eight biggest cities access to wireless broadband Internet from Internet-accessible mobile devices such as laptops, palmtops, PDAs, mobile phones, and game consoles. In sum, prospects for the wireless Internet and m-commerce are promising, as many experts foresee that in the near future the number of Internet access through mobile devices will increase enormously.

Mobile technology has some distinctive features. The most unique feature is mobility which refers to the ability to communicate, inform, transact and entertain any place at anytime on the move without fixed Internet access (Clarke 2001). Another unique feature is that the mobile device is personal, which is always available on a person and retains its user identity (Kannan Chang and Whinston 2001). These two technological features endow mobile Internet applications' compelling characteristics, which differentiate them from those of wired Internet application. Mobile users obtain 'mobile value' created through the use of mobile Internet applications (Anckar and D'Incau 2002).

¹ Computerworld, December 16, 2002

² <http://networks.silicon.com/mobile/0,39024665,39155297,00.htm>

Although a few studies have focused on mobile value from the distinctive feature of a wireless mobile technology perspective, limited attempts have been made to study mobile value from a mobile application perspective. In this study we elaborate mobile application values as: utilitarian and hedonic values. Based on these two values, we conceptualize two types of tendency on mobile users' application use: utilitarian tendency and hedonic tendency. The goal of this study is to examine the relationships between mobile users' value tendency and their predispositions (i.e., socio-economic status and level of maturity) and their perceptions on mobile Internet service quality dimensions (i.e., connection quality, design quality, and information quality).

Even though the terminologies, mobile Internet and wireless Internet, are used interchangeably in many cases, they are different. Wireless Internet service can be defined to a Radio Frequency (RF)-based Internet service. Some of wireless Internet services such as Wi-Fi, Local Multipoint Distribution Service (LMDS), Multi-point Multi-channel Distribution Service (MMDS), and fixed wireless LAN, have limited or low mobility (i.e., mobile stationary service) within a restricted area (e.g., a building). In this study, mobile Internet is defined to the narrow wireless Internet service which provides high mobility in a wide area (e.g., a city-wide) through portable mobile devices such as a cell phone, a PDA, and a handheld computer. The mobile Internet service provides connectivity to the Internet while moving, while fixed type of wireless Internet service has limitations.

The remainder of the paper is organized as follows. The definition of the terms, mobile Internet and wireless Internet are discussed at the remaining part in section one. In section two, we present some background literature regarding mobile values and discuss two types of tendency on mobile user's application use as key study concepts. The third section proposes a research model with a discussion of the research constructs in the model and with hypotheses. The fourth section discusses research methodology and data collection. The results of the data analysis of study follow in the fifth section. The final section concludes with a discussion of the findings, as well as the limitations and implications of this study.

CONCEPTUAL BACKGROUND ON MOBILE VALUES

Mobile Values

Value has been studied in many different disciplines (e.g., psychology, economics, finance, marketing, information systems, and e-commerce) and many different terminologies are used to describe value such as customer value (Woodruff 1997), transaction value (Dyer 1997; Grewal Monroe and Krishnan 1998), acquisition value (Grewal et al. 1998), service value (Cronin Brady Brand Hightower and Shemwell 1997; Heinonen and Strandvik 2005), and system value (King and Epstein 1983; Mookerjee and Dos Santos 1993; Pienaar Kruger and Adendorff 1986; Young 1984). Although a large volume of literature is available on value, due to the relative novelty of mobile technologies and mobile Internet services, studies concerning mobile values are still scarce.

Recently, based on the distinctive features of mobile devices (i.e., any-time, any-place, always-on, and personal device), several studies identified the following mobile values: ubiquity, time-criticality, spontaneity/immediacy, accessibility, convenience, personalization, location discovery, etc. These mobile values are not uniform across all the literature; some of them are strongly associated with each other. Always-on mobile devices allow users to get time-critical information in an urgent situation (Anckar et al. 2002). The "omnipresence" characteristic of mobile devices also enables mobile users to access mobile services at anytime from anyplace (Anckar et al. 2002; Kannan et al. 2001; Siau Lim and Shen 2001). This mobile value is conceptualized as ubiquity (Clarke 2001; Siau et al. 2001), time-criticality (Anckar et al. 2002), spontaneity/immediacy (Anckar et al. 2002), and accessibility (Clarke 2001). *Ubiquity* is the ability to allow mobile users to obtain information and conduct mobile transactions anyplace through Internet-enabled mobile devices. *Time-criticality* refers to the ability of mobile devices to satisfy time-critical needs that require prompt and to-the-point interactions (Sadeh 2002). A similar value to time-criticality, *spontaneity/immediacy* refers to the mobile capability for mobile users to get information and complete transactions in real-time. Since mobile devices provide continuous and immediate access to the Internet, mobile users have high *accessibility* to the Internet in niche time or in a "dead spot" as when waiting in line or moving in traffic (Baldi and Thaug 2002; Clarke 2001).

The ubiquities feature of mobile service provides the mobile value related to *convenience*. For example, the mobile technology with basic health monitoring applications provides a convenient way of checking an individual patient's health conditions. *Efficiency* refers to reducing costs, encompassing not only monetary but also search costs, selection range, simplicity, and speed, through the use of the mobile technology. The seamless domain roaming feature of mobile technology allows mobile users to monitor time-sensitive information (e.g., stock trading) in real-time and to make decisions right away, which increases the productivity of time-pressured users in everyday activities (Anckar et al. 2002).

The unique features of mobile devices provide values to mobile service providers. Since mobile devices are personal stuff, they contain individual information as well as personal preferences. With knowledge of users' behaviors and their preferences, mobile service providers can offer more *personalized services* to mobile users (Sadeh 2002). This characteristic also provides an opportunity to mobile service providers for individual-based target marketing (Baldi et al. 2002; Clarke 2001; Sadeh 2002). Another mobile value is *location discovery*. Since mobile devices are always on and carry user identity, the location of the mobile user can be tracked (Baldi et al. 2002; Clarke 2001; Kannan et al. 2001). This allows mobile service providers to do location-based marketing and to deliver promotional offerings based on a user's current geographic position (Clarke 2001). By combining personalization and location discovery features, it will be possible to provide "infotainment" service i.e., location-based entertainment services based on the users' preference (Baldi et al. 2002).

Utilitarian Value and Hedonic Value of Mobile Applications

Most of the studies on mobile value focused on the unique feature of mobile technology. However, some values depend on the types of mobile applications offered by mobile Internet. Atkin (1973) argues that there exists two types of purpose of consumers' information seeking process. One is a utilitarian purpose that is achieved when an individual considers message content as a means toward solving his or her practical problems, and the other is a non-instrumental, entertainment purpose that serves personal interest in a subject matter. The former, termed as instrumental utility of the media, is sought when people use messages that provide information necessary for adapting to practical environmental and psychological problems. The latter is a hedonic purpose that is sought when an individual exposes himself or herself to mass media content because it provides a pleasurable sensation.

Adopting Atkin's two types of purpose of consumers' information seeking process, this study conceptualizes mobile application values as two types: utilitarian and hedonic values. The utilitarian values derived from an economic concept in the information-processing paradigm are the result of useful, economically efficient and productive experiences, while hedonic values are the outcome of fun, pleasurable and enjoyable experiences (Carpenter Moore and Fairhurst 2005). Based on the two mobile application values, we conceptualize two types of tendencies of mobile users' application use: utilitarian tendency and hedonic tendency. *Utilitarian tendency* on mobile applications refers to the mobile user's preference to use mobile services which have more functional and economically meaningful values such as mobile shopping, mobile banking, news etc. *Hedonic tendency* refers to the preference of mobile users to use mobile services which provide the emotional or psychological worth such as mobile chatting with friends, mobile games, sports, and mp3 music play, etc. Hedonic tendency is a more personal usage compared to utilitarian tendency.

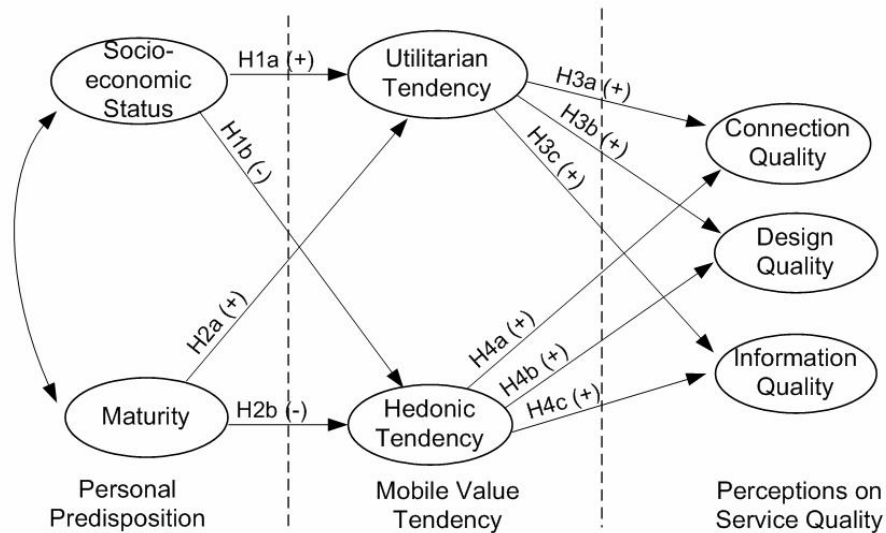


Figure 1. Research Model

RESEARCH MODEL AND HYPOTHESES

Previous researches on the “digital divide” found that there exists very strong relationships between age, ethnicity, education, and socio-economic status on one hand, and Internet usage on the other (Kraut Mukhopadhyay Szczypula Kiesler and Scherlis 1999). Demographic and individual differences apparently help determine the appeal of the interactive features of mobile service (Mundorf and Bryant 2002). Even though the younger generation has shown a higher preference in interactivity than the older generation, it should be remarked that mobile Internet is not an exclusive service for younger users, and older consumers must be taken into account on the basis of the types of applications they use.

In this study, based on mobile users’ two types of application tendencies (i.e., utilitarian and hedonic), we propose a research model (see Figure 1) to analyze mobile users’ application value tendencies by taking into account personal predisposition variables, (i.e., socio-economic status and maturity level). The model also examines the relationships between mobile users’ application value tendencies and their perceptions on mobile Internet service quality in terms of three mobile service quality dimensions (i.e., connection quality, design quality, and information quality).

A variety of empirical studies confirm the hypothesis that the socio-economic status at an individual level (i.e., the average standard of living and the average educational level in a county) is strongly related to the usage of Internet (Chen Boase and Wellman 2002; Chinn and Fairlie 2004). In the mobile Internet context, since the socio-economic status is indicated by occupation, education and house income level, we expect that people differ in the extent to which they use mobile Internet applications. Those of a higher socio-economic status use them for more utilitarian and functional purposes while those of a lower socio-economic status use them for more hedonic and entertainment purposes. Therefore, we propose that:

H1a: Mobile users who have higher levels of socio-economic status are more likely to show a higher utilitarian tendency of mobile Internet use.

H1b: Mobile users who have higher levels of socio-economic status are less likely to show a higher hedonic tendency of mobile Internet use.

We also expect that maturity level is related to the mobile value tendency of mobile Internet applications. The level of maturity is measured by age and education in this study. In general, it is accepted that adults with a high education are considered as having a higher maturity standing than youth with a low education (or still at school). Thus, we predict that less mature users will show high usage tendencies toward hedonic applications for entertainment purpose than more mature users, who alternatively, will show high usage tendencies toward utilitarian applications of mobile Internet. These views lead to:

H2a: Mobile users who have a higher level of maturity are more likely to show a higher utilitarian tendency of mobile Internet use.

H2b: Mobile users who have a higher level of maturity are less likely to show a higher hedonic tendency of mobile Internet use.

Some gratification factors such as mobility, immediacy, instrumentality, sociability, relaxation, entertainment, fashion, acquisition, reassurance, and status are identified as the important motives in predicting the use of mobile phones (Leung and Wei 1998, 2000). These factors are classified as two broad categories as instrumental/utilitarian and entertainment/hedonic motives. The distinct features of the mobile Internet service provide ubiquity of Internet access and immediate interactivity of communication. In addition, the mobile device differs from the stationary desktop computer that accesses the Internet, since it is a more personal device to be used by only one single person. In sum, mobile Internet technology allows users to actively utilize mobile applications for their personal purpose beyond the limitations of time and space.

Along with the instrumental/utilitarian incentives of mobile Internet applications, entertainment/hedonic motivations for the use of mobile Internet are also grounded because of the personalization of mobile devices and applications. Within mobile Internet applications, a utilitarian tendency is relevant for task-specific use of mobile Internet such as online shopping, stocks trading, mobile banking, and shopping, while hedonic tendency is related to the use of mobile Internet for entertainment/sociability purposes such as gaming, and chatting. Apparently, mobile value tendency is not much related to mobile users’ service quality perceptions, but due to the unique gratification factors (i.e., any-time, any-place, always-on, and personal device) of mobile technology, which are the important motives to use mobile Internet service, mobile users may have different expectations of mobile Internet service quality. Mobile users who have different usage tendencies may vary their perceptions on mobile Internet service quality.

The study on service quality has a long research history and SERVQUAL has become a popular method for measuring service quality (Cronin Brady and Hult 2000; Dabolkar Shepard and Thorpe 2000; Dyke P. Kappelman and Prybutok 1997; Dyke P. Prybutok and Kappelman 1999; Gronroos 1984; Parasuraman Zeithaml and Berry 1985; Parasuraman Zeithaml and

Berry 1988; Pitt Watson and Kavan 1995). The SERVQUAL has five key dimensions: tangibles, reliability, responsiveness, assurance, and empathy. However, as pointed out by Dyke et al. (1997; 1999), the number and dimensions of service quality vary depending on the context and culture involved. Although SERVQUAL is an excellent model for measuring service quality in general, we found that the dimensions of SERVQUAL are inadequate because they do not fully explain the criteria important to customers of emerging markets such as mobile Internet. In this study, we proposed three dimensions of mobile Internet service quality: connection quality, design quality, and information quality. Connection quality refers to mobile user's perception on the connection quality to access a mobile service without any obstructions or connection delays. A high quality mobile Internet service should provide an acceptable speed for the mobile user on a variety of devices. Connection quality is important to both utilitarian and hedonic tendency users because stable and reliable connection to the Internet is an essential element for their mobile Internet usage satisfaction. *Design quality* of mobile Internet service is also important for mobile users' perception on service quality since mobile devices have a small screen with a limited input interface. *Information quality* refers to how useful and valuable the content that the mobile Internet service provider's portal site provides to users (Berry and Parasuraman 1997). When mobile users have a stronger utilitarian and/or hedonic tendency to use mobile Internet service, they are more likely showing high quality perceptions on mobile Internet service. Thus, we propose that:

H3: Mobile users who have a higher level of utilitarian tendency are more likely to show higher perception on connection quality (H3a), design quality (H3b) and information quality (H3c) of mobile service.

H4: Mobile users who have a higher level of hedonic tendency are more likely to show higher perception on connection quality (H4a), design quality (H4b) and information quality (H4c) of mobile service.

RESEARCH METHODS AND DATA COLLECTION

The research utilizes the data that was collected by the Korean Network Information Center (KRNIC), an institution equivalent to the InterNIC in the USA. KRNIC represents a non-profit organization founded in 1999 for the purpose of developing a stable policy regarding the assignment of domain names and IP addresses in Korea.

A nation wide survey was conducted to mobile Internet users during March 2002 in South Korea using a stratified sampling method by region, gender, and age. A structured questionnaire was used to collect broad information about overall demographic data, cellular phone use patterns and tendencies, mobile Internet use patterns and tendencies, satisfaction levels, and landline Internet usage. All survey questionnaires were filled out on a paper-and-pencil basis while a data collector was present to help respondents to better understand the questions. Among a total of 3,000 respondents, 881 responded that they had a mobile Internet experience in the past six months. After eliminating incomplete and missing responses, a total of 719 usable responses were analyzed.

Measures

Each construct was measured by at least two measurement items. Socio-economic status was measured by three items: occupation, education and household income level. Maturity level was measured by age and education. The mobile value tendency variables were measured by two items that asked: "What are the three main mobile Internet contents you currently use?" and "What are the three main mobile Internet contents that you wish to use in the future?" Respondents were asked to rank three applications as first, second and third choice. The list of contents included fourteen choices: e-mail, character/melody(bell) tone/picture download, game, coupon/lottery, stock exchange/banking/investing, shopping/ticket reservation, chatting, sports scores or variety, location/travel services, news, surfing internet portal sites, adult entertainment, studying, and others. Among these contents we considered game, character/melody(bell) tone/picture download, chatting, sports scores or variety, and adult entertainment as hedonic applications, while all others were labeled as utilitarian applications (Sheehan 2002). For the first choice, depending on it being either a utilitarian or hedonic application, three points were assigned to the corresponding tendency. By the same token, for the second choice, two points, and as for the third choice, one point was allotted to either utilitarian or hedonic use tendency. Therefore, a respondent could receive any scale from zero to six for entertainment and functional use tendencies.

Controversies might arise about this method of distinction between hedonic and utilitarian use, especially regarding e-mails as a functional application. It should be noted that scholars have been labeling the e-mail as interpersonal communication (Kraut et al. 1999), and there exist enjoyment-oriented uses of e-mails, such as expressive communication. However, those types of e-mail uses entail certain purposes, primarily to sustain or enhance relationships with peers. Moreover, as instant messaging and chat rooms are growing popular, e-mails, alternatively, are becoming less likely to involve entertaining purposes (Boneva Kraut and Frohlich 2001).

Mobile users' perception on connection quality is measure by three items: mobile Internet initial connection speed, data transferring speed, and stability of connection. Design quality is measured by three items: the perceived friendliness of the mobile device interface, easy information search and menu navigation, as well as the ease to read the screen content. Information quality is also measured by three items: comprehensiveness of information, diversity in information source, and update of information.

DATA ANALYSES AND RESULTS

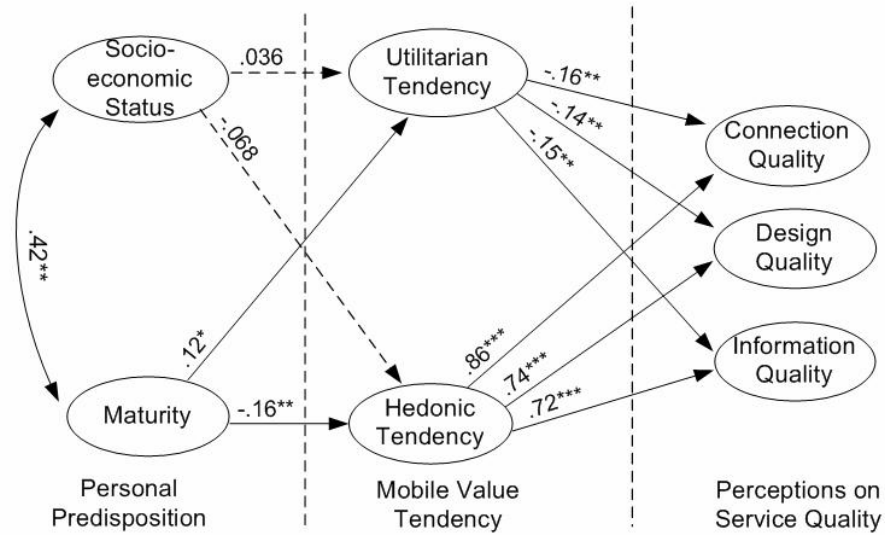
The present research used both AMOS 6.0 and Partial Least Squares (PLS-Graph version 3.0.1060) to test the measurement model and structure model because PLS-Graph and AMOS can be regarded as complementary. Based on covariance analysis, like LISREL, AMOS is more confirmatory in nature and it provides various overall goodness-of-fit indices to assess model fit for convergent validity (Byrne 2001) while PLS-Graph requires minimal demands on measurement scales, sample size, and residual distributions (Chin 1998). PLS-Graph reports composite reliability (CR) and average variance extracted (AVE) for content validity and discriminant validity. The reliability was gauged via the Cronbach's Alpha coefficient that was suggested by (Nunnally 1967) and (Churchill 1979). All reliable Alpha coefficients exceeded 0.7, the minimum cutoff score (Nunnally 1978; Nunnally and Bernstein 1994) except for the hedonic tendency (Alpha = .694) which is very close to the threshold value. Composite reliability is also used to check the internal consistency, which should be greater than the benchmark of 0.7 to be considered adequate (Fornell and Larcker 1981). All composite reliabilities of constructs have a value higher than 0.7. To evaluate discriminant validity, the average variance extracted (AVE) is used. All constructs have an AVE of at least 0.5 (Fornell and Larcker 1981) and all the square roots of each AVE value are higher than the off-diagonal correlation elements (Chin 1998; Fornell et al. 1981). Table 1 shows the summarized reliability indices.

Variables	No. Items	Alpha	Composite Reliability	AVE	1	2	3	4	5	6	7
1. Socio-economic Status	3	.755	.776	.689	.830						
2. Maturity	2	.803	.900	.718	.462	.847					
3. Utilitarian Tendency	2	.732	.844	.671	.301	.369	.819				
4. Hedonic Tendency	2	.694	.842	.727	-.305	-.374	-.499	.853			
5. Connection Quality	3	.801	.815	.596	.047	.119	-.142	.153	.772		
6. Design Quality	3	.759	.866	.684	.071	.095	-.089	.100	.587	.827	
7. Information Quality	3	.774	.772	.545	.028	.050	-.059	.066	.491	.495	.738

Table 1: Descriptive Statistics and Correlation for the Measured Variables

To verify the structure model, we conducted a Structural Equation Modeling analysis using AMOS 6.0. The results are presented in Figure2. All model fit indices of the model are satisfying the suggested values (See Table 2 in detail).

Unlike our expectation, socio-economic status is not strongly correlated with utilitarian tendency and hedonic tendency; H1a and H1b are not supported. The results show that maturity is strongly associated with mobile users' utilitarian tendency and hedonic tendency; H2a and H2b are supported. Interesting findings are present regarding the relationship between mobile value tendency and mobile users' perception on mobile Internet service quality. As we expected, mobile users' hedonic tendency is strongly and positively associated with mobile Internet service quality perceptions; H4a, H4b, and H4c are supported. However, utilitarian tendency are strongly and negatively associated with all three mobile Internet service quality dimensions; H3a, H3b, and H3c are not supported. In other words, the higher level of utilitarian tendency a mobile user has, the less likely he or she shows perception on high connection quality, high design quality, and high information quality of mobile service.



Note: * Significant at the 0.05, ** significant at the 0.01, *** significant at the 0.001 level

Figure 2: Results

Statistic	Suggested Value	Value
Chi-square		261.125
Chi-square significance	P <= .05	0.000*
Chi-square/d.f.	< 5.0	2.535*
RMSEA	<= 0.06 (Hu and Bentler 1999)	.046*
NFI	> 0.90 (Kelloway 1998; Kline 1998)	.969*
TLI	>= 0.96 (Hu et al. 1999)	.975*
CFI	>= 0.90 (Bentler 1990)	.960*
GFI	> 0.80 (Joreskog and Sorbom 1988)	.860*
AGFI	> 0.80 (Joreskog et al. 1988)	.841*

Note: * satisfy the suggested value

Table 2. Model fit indices of the structure model

DISCUSSION AND CONCLUSION

The empirical findings of the study show that socio-economic status is not related, but the level of maturity is related to mobile application tendencies (i.e., the younger and less educated mobile users are, the more likely they are to have hedonic tendency, while the older and more educated users have more utilitarian tendency). Hedonic tendency is positively related to higher mobile Internet service quality perception. Interestingly, utilitarian tendency shows negative associations with mobile users' higher service quality perceptions. A possible interpretation of this result is that compared to hedonic/entertainment mobile applications, utilitarian/functional ones require more speed and a more stable network connection to satisfy mobile users' time-critical, immediate, and efficient task needs. However, the mobility context and the technical limitations of current mobile technology such as smaller display size, lower resolution, less powerful onboard hardware and input peripherals, and slower connectivity may constrain the effective use of mobile applications for those mobile users who have a utilitarian tendency. Thus, they may have negative perceptions on connection quality, design quality, and information quality. Further future investigation on these relationships is needed.

This study provides some theoretical contributions on the mobile value study. First, two distinctive mobile values (i.e., utilitarian value and hedonic value) are identified and distinguished from each other. Second, the relationships between mobile users' value tendencies and their perceptions on mobile Internet service quality were tested. The results provide evidence that they are not always positively associated with each other. It would be possible that the limitation of current mobile technology play a mediating or moderating role between mobile users' tendency and their perceptions on mobile Internet service quality. This study also provides practical implications. First, practitioners may use maturity level rather than socio-economic status to segment their mobile users for target marketing and/or product promotion purposes. Second, when mobile Internet application or content providers develop a market strategy to target the younger generation, they might highlight entertainment/hedonic features more than functional/utilitarian ones, because these young users are mostly early adopters and entertainment seekers. In addition, since mobile users who have utilitarian tendency show negative mobile Internet service quality perceptions in order to retain them, practitioners should develop more reliable and convenient mobile Internet service, and a high quality mobile portal site in terms of information quality.

This study has some limitations that offer future research opportunities. The empirical data used for this study was collected in South Korea, a fast growing mobile technology market which may have a culturally and technologically different environment from some other countries. Therefore such narrow focused data may limit the generalizability of the results. Future research may replicate this study in other countries.

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