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INFORMATION QUALITY FOR MOBILE INTERNET SERVICES: A THEORETICAL MODEL WITH EMPIRICAL VALIDATION

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Abstract

Providing customers with high quality of information is a key determinant for the success of the mobile Internet. This study aims at identifying the important dimensions of information quality in increasing user satisfaction and customer loyalty for mobile Internet services. In order to achieve this goal, we propose a general model of information quality with four dimensions. The dimensions were constructed by expanding prior research in information quality in order to reflect the characteristics of the mobile Internet. We hypothesize that the four dimensions are positively related to user satisfaction and customer loyalty, and that their relative importance varies according to user goals. To validate the hypothesized model, we conducted a large-scale Internet survey with mobile Internet users. The results indicate that some dimensions are more important than others in increasing user satisfaction and loyalty, and relative importance of the dimensions varies according to the intended goals of mobile Internet contents.

Keywords: Information quality, mobile Internet.

INTRODUCTION

Mobile Internet is defined as the wireless access to the digitized contents of the Internet via mobile devices (Francis 1997). With the use of the Internet in mobile devices, it becomes easy to gain access to the tremendous amounts of information on the Internet, *anywhere* and *anytime*. For example, we can read critical email messages immediately as they arrive by using Internet-enabled cellular phones or compare the product information between shops around us while shopping with PDAs (Albers and Kim 2000). Therefore, benefits of the Internet may be significantly enhanced if the Internet can be made available anytime, anywhere via mobile devices (Buyukkokten and Barcia-Molia 2000). For this reason, the mobile Internet has gained rapidly in popularity in recent years. The number of people using the mobile devices to connect to the Internet has already exceeded that of stationary Internet usage in Japan and a similar trend is expected worldwide by 2002 (NUA Survey 1999).

However, the potential benefits of mobile internet access may be reduced by the difficulties that arise from limitations of mobile devices: small and low resolution displays, limited storage and battery life, slow CPU speeds, and data transfer difficulties (Kamba et al. 1996). These limitations make users demand higher quality of information in mobile Internet usage because they have to expend more effort in dealing with awfully cumbersome devices. Therefore, people are not willing to pay for mobile Internet services unless they can find much higher quality information that outweighs the cost of access (Chae et al. 2000a). Accordingly, providing high quality information is an important factor for mobile Internet businesses, not only for acquiring customers by satisfying them during their first time use, but also for achieving customer loyalty by making the customers use them again and again in the future.

However, even though information quality is expected to impact adoption loyalty through user satisfaction, service providers are still guessing their way through the design of mobile content services. Should we focus on improving the quality of access by reducing system failure, or should we focus on improving the quality of interaction by facilitating navigation in information

environments? Without an understanding of the various dimensions of information quality in mobile Internet services, it is difficult to provide effective guidelines to mobile service providers.

However, little is known about a theoretical framework focused on the information quality of mobile Internet service reflecting its characteristics, which are drastically different from those of stationary ones. Hence, we propose a theoretical model of information quality for mobile Internet services and validate the model with a large-scale survey.

THEORETICAL FRAMEWORK OF INFORMATION QUALITY FOR MOBILE INTERNET CONTENT

Many recent studies have investigated the quality of information from diverse sources, such as databases and web pages (Huang et al. 1999; Katerattanakul and Siau 1999; Wang 1998). For example, Huang et al. suggested four major dimensions of information quality, consisting of accessibility quality, content quality, contextual quality, and representational quality. We modified their four dimensions in order to reflect the characteristics of information environments of the mobile Internet, which are significantly different from those of the stationary Internet. These differences make it impossible for their framework of information quality, built mostly in the stationary environment, to be applied directly to the mobile Internet.

Information Environments of Mobile Internet

The information environment of the mobile Internet is different from that of the stationary Internet from three important perspectives (Chae et al. 2000b). First, in terms of the resource availability, most mobile Internet devices have a much lower level of available resources compared to the stationary Internet (Kamba et al. 1996). Mobile Internet devices usually have much smaller screens, less convenient input/output facilities, and lower multimedia processing capabilities compared to desktop computers. Second, in terms of accessibility, mobile Internet systems usually provide instant accesses to the Internet which enables users to access the Internet, anywhere and any time (Buyukkokten and Barcia-Molia 2000). Third, mobile Internet users are usually involved in various use contexts as they move around freely with mobile devices (Dey 2001; Schmidt et al. 1999). Compared to the stationary Internet, which is mostly used in the limited contexts such as at the office or at home, the mobile Internet can be used in much more diverse contexts such as in a car or while walking.

Information Quality of Mobile Internet Services

Considering those characteristics mentioned above, we propose a framework of information quality that is specific to mobile Internet services (Huang et al. 1999). In our framework, several extensions have been made to the prior framework of information quality. For example, the qualities of mobile devices are added to our framework because the quality of mobile contents is heavily influenced by the quality of hardware devices, which is not quite the same for the stationary Internet. Another extension is made on the contextual quality of mobile contents because providing contents at the right time in the right place for the right people is significantly more important in the mobile Internet (Dey 2001). These extensions result in a framework of information quality in mobile Internet services with four major dimensions: connection quality, content quality, interaction quality and contextual quality, which are explained in detail below.

Connection Quality

Connection quality is achieved when customers can confidently access the mobile service without interruption of connection so that they can focus on their original tasks in a stable environment. In other words, mobile Internet services should minimize connection errors that may prohibit customers from accessing information within the site and should provide speedy response to users' inputs. Stable and speedy responses from the service are especially important in the mobile Internet because of the instant accessibility characteristic of the mobile information environment mentioned above. Therefore, the connection quality is further decomposed into *perceived stability* and *responsiveness* of mobile Internet services. To measure the two sub-constructs of the connection quality, Purdue Usability Testing Questionnaire (PUTQ) (Lin et al. 1997) and access quality measures of prior information quality (IQ) (Huang et al. 1999) will be used in this study.

Content Quality

Content quality refers to the inherent value and usefulness of the information provided by the mobile service (Huizingh 2000). We expand the intrinsic quality of Huang et al. into the content quality by combining the *value of its own* (i.e., objectivity and believability) and the *relevancy to the task* of information customers (i.e., amount of information and completeness) because the objective and credible information that is highly relevant to the users' task should be provided in a relatively small screen. In other words, the content should be backed up with objective and credible arguments to the users, and at the same time should provide enough information to be useful to the user's task. Therefore, items from intrinsic quality and contextual quality of IQ (Huang et al. 1999) will be adopted to measure the content quality of mobile Internet service in this study.

Interaction Quality

Interaction quality is achieved when mobile Internet services provide easy and efficient methods of interaction. We expand the representational quality of Huang et al. into the interaction quality by including usability issues because the awkward input device on the small display demands a high level of efforts while interacting with mobile Internet services (Kamba 1996). It has been estimated that every additional click a user needs to make in interacting through mobile Internet sites reduces the probability of a transaction by 50% (Durlacher Research 2000). Accordingly, interaction quality can be measured by the usability quality in terms of *structure*, *navigation,* and *presentation* on the mobile Internet service. The *structure* of information should be self-descriptive indicating where the specific information is located so that visitors may easily find it, while *navigation* should guide the customers through the information space without making them lose track of where they are relative to other locations. In terms of *presentation*, the information should be presented on the screen so as to be clearly understandable to the users. To measure these three sub-dimensions, perceived usefulness and ease of use (PUEU) (Davis 1989) and the questionnaire for user interface satisfaction (QUIS) (Chin et al. 1988) measures will be adopted in this study.

Contextual Quality

Contextual quality is achieved when the mobile Internet services are considered within the context of the user's task at hand: customers must be able to use the information anytime and anywhere with little effort in getting access to it. We extend the contextual quality of Huang et al. by emphasizing the importance of environmental contexts because providing information at the right time in the right place is significantly more important for mobile Internet users to support their immediate needs in a prompt way (Dey 2001). Therefore, contextual quality highlights the important characteristics of the mobile Internet; namely, *timeliness*, by which customers can gain unrestricted access to information regardless of time and place, and *promptness*, so that the process of accessing the information is straightforward. To measure the contextual quality in mobile Internet services, we introduce new measures reflecting the properties of timeliness and promptness, which will be explained in detail later.

User Goal and Information Quality

The limited resources of mobile Internet devices and the various contexts of mobile information environments increase the importance of users' goals (Schmidt et al. 1999). This is because different user goals of users require radically different information especially when the users have to use limited resources within widely varying environments. Therefore, the same information quality may have different impacts depending on the different goals of users in mobile Internet services.

In general, users' goals can be classified into two categories: utilitarian or hedonic (Dhar et al. 2000). Users with utilitarian goals pursue specific information, whereas those with hedonic goals surf while enjoying themselves without a specific purpose.

As a number of previous studies in the marketing field have discovered, the quality of service or product, which the customer perceived, influences the level of satisfaction and customer loyalty (Fornell 1992). Therefore, we hypothesize in this study that the same information quality may have different impacts on user satisfaction and also on customer loyalty for users with different goals. For example, information with the same content quality may be more effective in increasing the level of user satisfaction for customers with utilitarian goals of information searching than for those with hedonic goals. Therefore, the two types of users' goals are expected to act as a moderating variable between the four dimensions of information quality and user satisfaction, which will be explained more explicitly in the next section.

THEORETICAL MODEL OF INFORMATION QUALITY IN THE MOBILE INTERNET

Based on the relevant literature, we propose the latent variable model for information quality of mobile Internet services. The proposed model consists of six constructs: four dimensions of information quality, and one for user satisfaction and customer loyalty, respectively. The constructs and their relationships are presented in Figure 1. The coefficients for the paths represent the proposed relations among the latent constructs. The theoretical hypotheses to be tested, grounding on each of the relations, are as follows:

H_1: Each information quality dimension (connection, content, interaction, contextual) is positively related to satisfaction.

H_2: Perceived user satisfaction will have a positive impact on customer loyalty.

H_3: The customer's intended goal of use will moderate the hypothesized relations between information quality dimensions and user satisfaction.

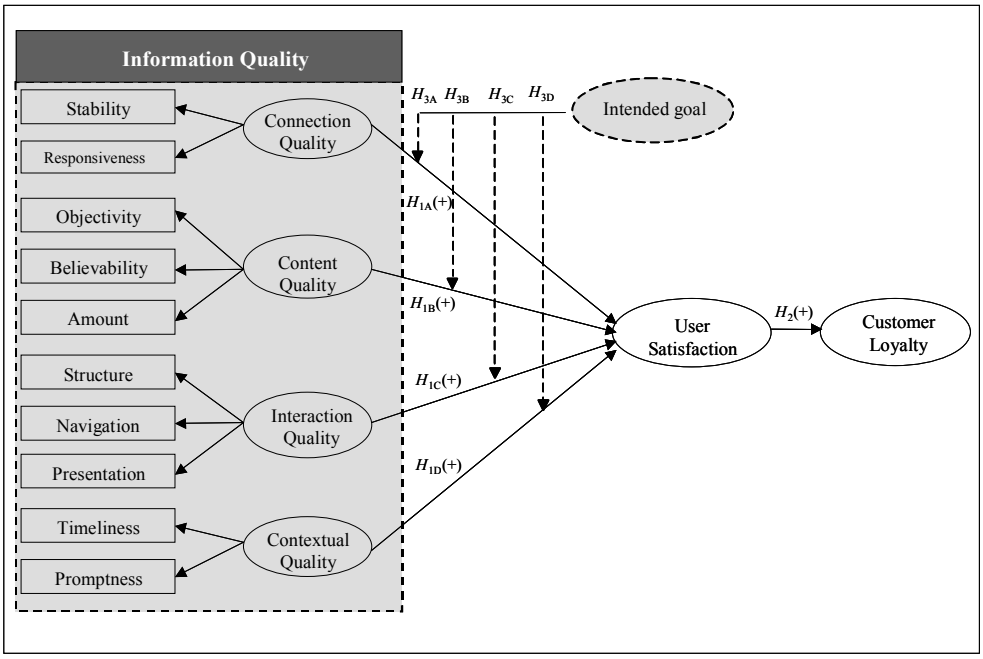


Figure 1. Theoretical Model of Information Quality for the Mobile Internet

METHODOLOGY

Online Survey

A research consortium was organized in order to gather basic usage data of mobile Internet services. Sixteen companies participated in the consortium, including all of the major mobile telecommunication carriers and Internet portals in Korea. In November 2000, an on-line survey was administered via a web site (Chae et al. 2000a). In two weeks, a total of 10,329 responses were collected.

All of the responses were verified with the cooperation of mobile telecommunication carriers to check whether the respondents actually owned Internet-enabled phones and had used mobile Internet services at least once prior to responding to the survey. Consequently, 1,568 responses were dropped from further analysis because they didn't meet the criteria. Among the final 8,761 respondents, 67% were from males and 33% were from females. In terms of age demographics, most were between the ages of 18 and 23 (44.7%), followed by those between 24 and 29 (32.7%), then over 30 (15.0 %), and younger than 17 (7.6%).

Measures

In order to test the proposed model of information quality of mobile Internet services, a questionnaire for current mobile Internet users was constructed based on the relevant literature (Chin et al. 1988; Davis 1989; Huang et al. 1999; Lin et al. 1997). To insure measurement reliability and validity, a pilot study was conducted with 50 mobile Internet users. Based on the results of the pilot study, the items that did not contribute to the consistency and validity of theoretical constructs were excluded from the final questionnaire, leaving 26 questions for the main survey. The final questionnaire is presented in Appendix.

The final questionnaire was composed of three parts: measures for users' experience of mobile Internet service, subjective measures of information quality, and finally measures for user satisfaction and customer loyalty. The service experience part consists of three questions: (1) the specific mobile Internet service the respondent had used most recently, (2) how recently, and (3) the intended goal for accessing the service (i.e., utilitarian goal of information seeking or hedonic goal of killing time). After completing the customer experience part, respondents were asked to have in mind the specific service they chose while answering the rest of the survey. The subjective information quality part consists of 18 items: four items for connection quality, four for content quality, six for interaction quality, and four for contextual quality. Finally, the questionnaire included three items for user satisfaction and two for customer loyalty.

Data Analysis

To test our model of information quality in mobile Internet services, we conducted the following analyses. First, we confirmed the existence of four separate dimensions of mobile information quality through exploratory component factor analysis. We also computed Cronbach's alpha coefficients to the construction of measures using average of the scales. Second, in order to perform a cross validation test, two subsets of data were sampled from the full dataset. Third, the general structural equation model (i.e., including both utilitarian and hedonic goals) was evaluated to test the causal relations among the four dimensions of information quality, user satisfaction and customer loyalty. Finally, multi-group analysis was conducted with two structural models by splitting the sample into two sub-groups according to the user goal, utilitarian or hedonic.

RESULTS

Reliability and Validity of Measures for Information Quality

Table 1 shows the results of the exploratory factor analysis to measure the construct validity of the four dimensions of information quality. As can be seen in Table 1, the 18 items in the questionnaire are classified into four factors, indicating four constructs of information quality: factor 1 for connection quality, factor 2 for content quality, factor 3 for interaction quality, and factor 4 for contextual quality. Total cumulative percentage of variance explained by the four factors is 66.2% and the Eigenvalues of the four factors are above 1.00. Therefore, the extracted four factors corresponded to the four constructs of information quality as suggested in the proposed model.

Table 2 shows the results of four factor analyses that were conducted for each of the four information quality constructs in order to verify the validity of the corresponding sub-constructs. The factor analysis of the items for the connection quality identified two sub-factors, one of which came from the items for connection stability, and the other from items for responsiveness of connection quality. The cumulative variance of connection quality explained by the extracted two factors was 88.0%. For the content quality of information, only one component, consisting of three out of four questions, is extracted from factor analysis and it explains 87.6% of variance of content quality. This result is different from the theoretical model that has two sub-constructs for content quality with four items in total. We decide to proceed with further analysis regarding these three items as individual sub-dimensions, because our theoretical construct of content quality is still maintained without direct influence on the relations among latent variables. In the case of interaction quality, three sub-constructs were identified as proposed in the model mentioned above: structure, navigation, and representation. The cumulative variance of interaction quality explained by those three factors was 79.2%. Finally, the factor analysis of items for contextual quality identified two sub-factors, which are the timeliness and promptness of the information. The two sub-factors explained 89.9% of the variance of contextual quality of information. As all the Cronbach's alpha values for the sub-factors of connection, content, interaction, and contextual quality are above 70%, we proceeded by using the average value of the responses for each sub-factor as the value of observed variable for the structural model in the next section.

Table 1. Variance Explained by the Factors of Information Quality

Questions		Factor Loadings (n = 8,761)			
		Factor 1	Factor 2	Factor 3	Factor 4
Connection Quality (SQ)	SQ 1	0.17	0.09	*0.81*	0.18
	SQ 2	0.12	0.05	*0.82*	0.13
	SQ 3	0.28	-0.06	*0.81*	0.15
	SQ 4	0.31	-0.07	*0.78*	0.15
Content Quality (CQ)	CQ 1	0.10	0.15	0.14	*0.69*
	CQ 2	0.31	-0.05	0.17	*0.77*
	CQ 3	0.34	-0.03	0.20	*0.75*
Interaction Quality (IQ)	IQ 1	*0.56*	0.12	0.16	0.42
	IQ 2	*0.70*	-0.03	0.15	0.32
	IQ 3	*0.76*	0.00	0.18	0.00
	IQ 4	*0.79*	-0.10	0.17	0.11
	IQ 5	*0.67*	0.10	0.17	0.24
	IQ 6	*0.66*	0.05	0.20	0.22
Contextual Quality (TQ)	TQ 1	0.08	*0.87*	0.03	0.05
	TQ 2	0.07	*0.88*	0.03	0.04
	TQ 3	-0.03	*0.83*	-0.05	0.03
	TQ 4	-0.06	*0.80*	0.02	0.01
Cumulative Percentages of Explained Variance			66.2%		

* Principal component with Varimax rotation

** Underlined loadings denotes significant with cut-off point at .55

Table 2. Factor Analysis for Measuring Each Information Qualities

Information Quality	Factors	Sub-Factor 1	Sub-Factor 2	Sub-Factor 3	Cronbach's Alpha
		Stability	Responsiveness		
<Factor 1> Connection Quality	Eigenvalues	1.8	1.7		0.86
	% of Variance	44.9	43.1		
	Cumulative %	44.9	88.0		
		One component is extracted			0.74 (Item for completeness was excluded)
<Factor 2> Content Quality	Eigenvalues	3.4			
	% of Variance	87.6			
	Cumulative %	87.6			
		Structure	Navigation	Presentation	0.73
<Factor 3> Interaction Quality	Eigenvalues	1.6	1.6	1.5	
	% of Variance	27.1	26.2	25.9	
	Cumulative %	27.1	53.3	79.2	
		Timeliness	Promptness		
<Factor 4> Contextual Quality	Eigenvalues	1.9	1.8		0.90
	% of Variance	46.8	43.1		
	Cumulative %	46.8	89.9		

Cross Validation Results for the General Structural Equation Model

We randomly selected two sub-samples of 1,000 responses from the original data set stratifying by age and gender according to the demographics of mobile Internet users in Korea (Chae 2000a). One of the two samples was used as a *calibration* sample and the other was used as the *validation* sample for the cross validation of the model. We did this for two reasons. First, the random stratified sampling from the initial data set alleviates the problem of self-selection, one of the most serious drawbacks of web-based surveys. Second, two sets of sub-samples allow us to conduct the cross validation tests that reduce the potential for sampling bias problems. The two samples of 1,000 respondents were used to construct the general goal model of information quality. The goodness of fit indices for the two structural models and the cross validation index (CVI) between the two models are presented in Table 3. As can be seen in Table 3, the goodness of fit indices for the calibration and validation models are not significantly different, and the CVI between the two models is 0.21, which is close to zero. The result indicates that the two samples are homogenous and, therefore, the results from the calibration sample can be used as representative of the entire dataset (Browne and Cudeck 1983).

Table 3. The Goodness-of-Fit Indices for the General Goal Model

Model	χ^2	*df*	P-value	GFI	AGFI	NFI	RMR	RMSEA
Recommended[a]	Non-significant			Close to 1	> 0.80	> 0.90		< 0.08
C-model[b]	318.76	80	0.00	0.96	0.94	0.96	0.065	0.055
V-model	341.71	80	0.00	0.96	0.94	0.96	0.061	0.057

[a]Hair et al. 1998.
[b]The C-model is the calibration model and the V-model is the validation model for cross validation.

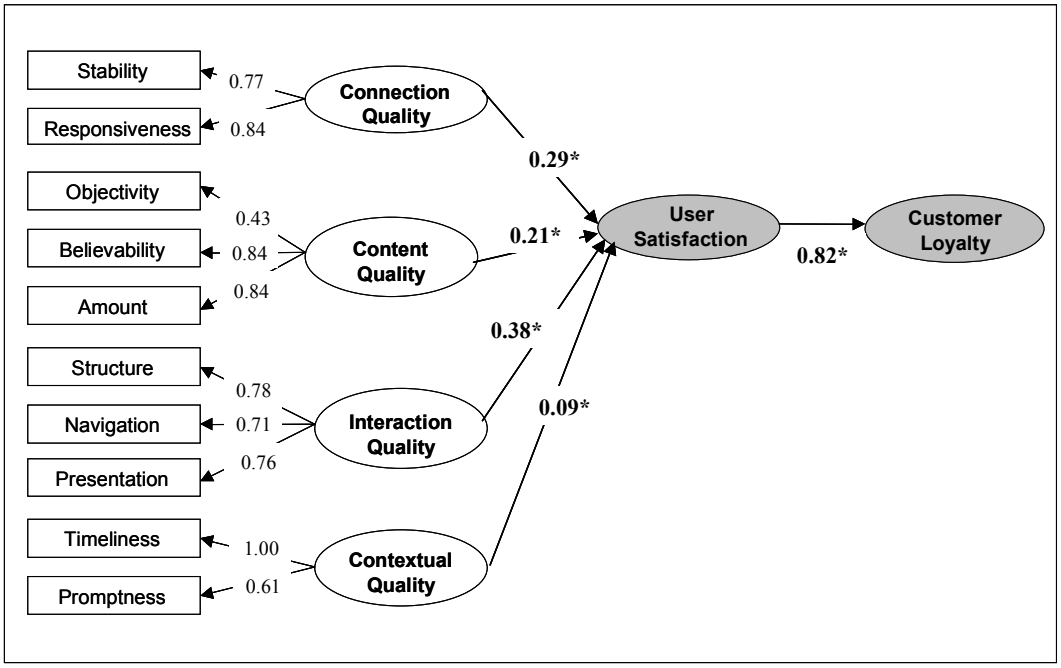
A General Model of Information Quality

Using structural equation modeling (SEM) analysis, the hypothesized sequence of relationships of the general model was tested as a set. The fit of the model (calibration model) was assessed using several goodness-of-fit indices as shown in Table 3. Those fit indices are within acceptable limits:[1] goodness of fit (GFI = 0.96), adjusted goodness of fit (AGFI = 0.94), normed fit index (NFI = 0.96), root-mean-square residual (RMR = 0.065), and root-mean-square error (RMSEA = 0.055). Therefore, these results suggest an appropriate model fit, indicating that the proposed model does a good job of explaining the relationships between latent constructs.

Figure 2 presents the LISREL results for the theoretical model of the general goal model of information quality using maximum likelihood estimation. Results include factor loadings of each observed variable and path coefficients representing the proposed relations between the latent constructs. All four constructs for information quality were found to have significant relations with user satisfaction, which, in turn, was shown to be significantly related to customer loyalty. Looking at the path coefficients, interaction quality (0.38) and connection quality (0.29) have larger impacts on users satisfaction than the other two constructs, content quality (0.21) and contextual quality (0.09).

We may interpret that all four constructs of information quality for mobile Internet services should be supported to satisfy users so that they will come back again in the future. In particular, the stable and responsive system connection and the quality of the user interaction of mobile Internet services are more critical factors than the other two, because services should be accessible with stable connections and easy to use in order to gain the content and contextual value of the information. In other words, no matter how much content or contextual quality is afforded, a mobile service is basically useless if the information is not accessible either because of connection failures or interaction difficulties.

[1]We do not consider the chi-square value as a GOF indicator to assess our model, because χ^2 GOF criterion is very sensitive to sample size and as sample size increases (generally above 200), the χ^2 test has a tendency to indicate a significant probability level (Marsh et al. 1996).



Latent variables are shown in ellipses, and observed variables are shown in rectangles. *All coefficients are significant at $p < .05$

Figure 2. Standardized Estimates for the General Goal Model

Two Sub-Structural Models for the Different Intended Goals

The 1,000 responses used for the general structural model were split into two sub-groups based on the answer to the item on the respondents' initial goal of use. Consequently, 48.2% of respondents accessed the mobile Internet information with the utilitarian goal of information search, while 51.8% used with the hedonic goal of entertainment.

In order to test whether the two groups are different, we conducted the multi-group analysis using nested chi-square tests (see Table 4 and Figure 3). The results indicate that the two groups are different in terms of the importance of content quality ($\Delta\chi^2 = 3.96, 1, p <. 05$) and interaction quality ($\Delta\chi^2 = 4.05, 1, p <.05$). The content quality was found to have a more significant impact on user satisfaction for the utilitarian users ($b = .26, t = 4.46, p < .05$) compared to the hedonic users ($b = .13, t = 0.53$). On the other hand, the interaction quality is found to have a more significant impact on user satisfaction for the hedonic users ($b = .49, t = 5.15, p < .05$) compared to the utilitarian users ($b = .29, t = 4.22, p < .05$). This might be because users with utilitarian goals might judge value more on the objectivity and credibility of information than on ease of use. For example, people using mobile trading services would like to get the exact stock price, hence for them how these stock prices are presented might not be as important as the accuracy of the information. On the contrary, users with the hedonic goals might value more the usability and aesthetic value of services than accuracy or credibility of information. For instance, people playing games from mobile services would not care much about the exact information of game characters but focus more on the ease of manipulation and appearance of the characters.

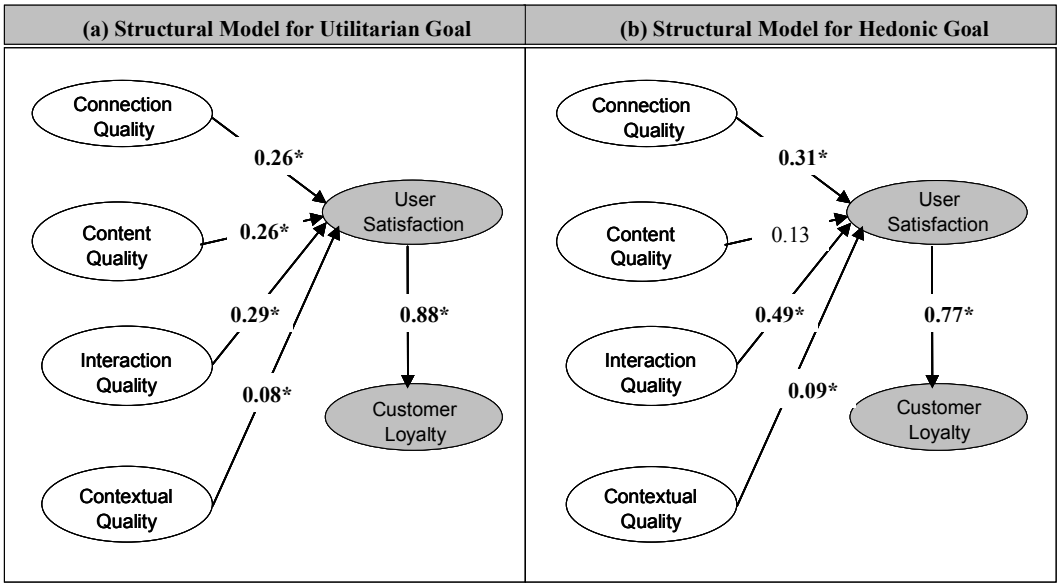
CONCLUSIONS AND DISCUSSION

A causal model of information quality for mobile Internet services was developed in this study and a large-scale survey was conducted to empirically test the causal model. The results of the survey clearly indicate that our model explains to a fair degree the impacts of information quality on user satisfaction and also on customer loyalty. The general goal structural model suggests that all four dimensions of information quality have significant impacts on user satisfaction, with connection and interaction quality having more substantial effects than content and contextual quality. The structural models with different user goals (i.e., utilitarian or hedonic) indicate that users with utilitarian goals value more the content quality of the services while those with hedonic goals value more the interaction quality.

Table 4. Test of Nested Goodness of Fit

Path (➔)		*b* Coefficient (*t*-value)		*Chi-square* ($\Delta\chi^2$)	*df*(Δ*df*)
Independent	**Dependent**	**Utilitarian**	**Hedonic**	**Unconstraint: 442.71**	**160**
Connection	User Satisfaction	0.26* (4.65)	0.31*(4.86)	Con_S: 443.03(0.32)	161(1)
Content		0.26*(4.46)	0.13 (0.53)	Con_C: 446.67(3.96)	161(1)*
Interaction		0.29*(4.22)	0.49*(5.15)	Con_I: 446.76(4.05)	161(1)*
Contextual		0.08*(2.51)	0.09*(2.50)	Con_T: 442.69(.002)	161(1)
User Satisfaction	Loyalty	0.88*(17.73)	0.77*(19.10)		

Con_S: The model constraint on the path between Connection and Satisfaction; Con_C: between Content and Satisfaction, Con_I: between Interaction and Satisfaction; Con_T: between Contextual and Satisfaction * $p < .05$



*Coefficient is significant at the level of $p < .01$.

Figure 3. Two Sub-Structural Models for the Different Intended Goals

Our results may have several contributions in terms of theoretical and practical aspects. From the theoretical perspective, we propose the framework of information quality for mobile Internet services, grounding on prior studies on information quality. We also provide full sets of measures for four dimensions of mobile information quality, and empirically validate the measures and model with the web-based survey. From the practical perspective, the study results suggest development guidelines for mobile services providers. For example, those companies developing mobile Internet services that are expected to be used primarily by users with hedonic goals should focus on interaction quality of the information such as by providing convenient navigation aids or delightful screen design. On the other hand, those developing utilitarian goal oriented mobile services should pay more attention to content quality of information such as securing credible sources of information or contracting with many information providers in order to obtain huge amounts of information.

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Appendix
Survey Questionnaire

The survey below is a translation from the original in Korean. The original survey instrument is available from the author.

1. Please choose a mobile internet service you have used most recently among followings.

1) Online game	10) Location-based information	19) Job
2) News	11) Humor/cartoon	20) Education/Dictionary
3) Sports/Entertainment	12) Literature	21) Free gift/Coupon/Event
4) Stock/Investment	13) Movie/Concert	22) Life/Law
5) Shopping	14) Traffic information	23) Live polling
6) Auction/Horse race	15) Fortune telling	24) Banking/Insurance
7) Leisure/Travel	16) Quiz/Electronic lottery	25) Melody download
8) Weather	17) Fashion/Beauty	26) Animation
9) Health	18) Wedding/love	27) Others ( )

2. When did you last use the mobile internet service that you selected above?

1) A day ago	3) 3days—a week ago	5) 2 weeks—a month ago
2) 1—3 days ago	4) 1—2 weeks ago	6) More than a month ago

3. What was the main goal to use the mobile internet content you chose above?
   1) With utilitarian goal of seeking specific information
   2) With hedonic goal of seeking overall pleasure

Questions: Please answer the following questions based on your experience for the mobile internet service you choose above.	**Strongly Disagree**			**Neutral**			**Strongly Agree**
4. This mobile internet content system is stable to use	1	2	3	4	5	6	7
5. This mobile internet content system has few errors	1	2	3	4	5	6	7
6. Downloading time is speedy enough	1	2	3	4	5	6	7
7. This mobile internet content system quickly responses for my input or clicks	1	2	3	4	5	6	7
8. The information this content provides is objective	1	2	3	4	5	6	7
9. The information this content provides is understandable	1	2	3	4	5	6	7
10. The amount of information is enough	1	2	3	4	5	6	7
11. The information is incomplete	1	2	3	4	5	6	7
12. The menus of this content site are clearly categorized	1	2	3	4	5	6	7
13. I can easily recognize where the information I need is located	1	2	3	4	5	6	7
14. I can easily move back to the page I previously visited.	1	2	3	4	5	6	7
15. While I was on the site, I was able to aware where I was	1	2	3	4	5	6	7
16. The information this content provides is consistently represented	1	2	3	4	5	6	7
17. The screen design of the content is harmonious	1	2	3	4	5	6	7
18. I can access to this content whenever I need	1	2	3	4	5	6	7
19. I can access to this content wherever I need	1	2	3	4	5	6	7
20. This content automatically recognizes me	1	2	3	4	5	6	7
21. The input process is quite simple to use this content.	1	2	3	4	5	6	7
22. I can effectively achieve what I want through this content	1	2	3	4	5	6	7
23. Using this content is overall interesting to me	1	2	3	4	5	6	7
24. This content is overall satisfactory	1	2	3	4	5	6	7
25. I would visit this content site again.	1	2	3	4	5	6	7
26. I am willing to pay for using this content	1	2	3	4	5	6	7