

The Second-Order Model of M-interactivity: Exploring the Performance of M-interactivity in Value, Satisfaction, and Loyalty

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Abstract

Despite the significance of mobile interactivity in the success of the business, there have not been many studies in the literature focused on distinguishing mobile interactivity (m-interactivity) from interactivity via the fixed broadband internet (e-interactivity). Accordingly, the current study builds a new conceptual framework for m-interactivity. First, within perception-based interactivity, we hypothesized a positive relationship between system-oriented and user-oriented interactivity (i.e., the second order model of m-interactivity). Second, we looked at the impacts of user-oriented interactivity on the consumer response variables of perceived value, satisfaction, and loyalty, as well as the relationships among consumer response variables.

Keywords: *M-Interactivity, Mobile Phone Usage, Hedonic Value, Utilitarian Value, Satisfaction, Loyalty*

1. Introduction

Since mobile devices have been penetrating our lives at a rapid pace, many researchers are showing greater interest in the concept of interactivity, particularly in mobile devices, along with their critical role in influencing mobile customers (e.g., [1-5]). While researchers agree that the interactivity of mobile devices appears to be more significant than that of other media including computers, most of them have not rushed into constructing a concept of interactivity for mobile devices or the mobile internet. Likewise, there is not much literature on m-interactivity. Instead, theories on e-interactivity have been adopted without reconstructing them [6]. While there is no agreed-upon definition of interactivity [5], many researchers have posited a number of dimensions of interactivity (e.g., [7-18]). Although the terms of the dimensions of interactivity vary across different studies, there are inherent recurring components: human beings, content, and media. McMillan (2002) [19] proposed three dimensions of interactivity: “human-to-human,” “human-to-document (content),” and “human-to-system (media).” Since individual users of mobile websites do not necessarily perceive document (content) and system (media) differently, the current study includes document (content) under system-oriented interactivity in order to align with consumer perception, which is the core variable of this study. Accordingly, the current study refers to interactivity in mobile internet environments as m-interactivity, while differentiating it from e-interactivity. Furthermore, the current study tries to build a new conceptual framework for m-interactivity by reviewing e-interactivity.

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2. Literature Review and Hypothesis Development

2.1. System-oriented Interactivity

The system includes all the mechanical components involved with the interface of a website such as the hardware and software [20]. Accordingly, system-oriented interactivity is operationalized in the current study as the interactive relationship between users and the interface of mobile websites. After a review of the relevant literature, these three dimensions of system-oriented interactivity were included: synchronicity, rich content, and contextual services.

As e-interactivity is influenced by the speed of the communication [15], *synchronicity*, referring to the speed of the communication [12] [15], has been included as one dimension of interactivity (e.g., [14] [21]). The internet supports both synchronous interactivities occurring in real time (e.g., instant messaging) and asynchronous interactivity, which does not necessarily occur in real time (e.g., e-mail) [22]. Still, in comparison with traditional media, the internet can be much more immediate [23]. Furthermore, the mobility of mobile devices has increased the chance of synchronous interactivity even more for mobile internet users. Ideally, the system should move at a speed that does not hinder the user [24]. As Liu and Shrum (2002) [23] pointed out, in order to have a high level of synchronicity, the system, such as websites, must support a speedy response to a user's actions. Therefore, synchronicity is included in system-oriented interactivity in the current study.

In terms of the content (i.e., all the information provided by websites or mobile applications such as product or service descriptions, videos, sound, advertising, FAQ, and reviews), two different levels of interactivity have been suggested. One is *richness of content* (e.g., [9, 7, 13]) and the other is users' active control over the provided content (e.g., [11, 7, 17, 25, 18, 14, 13]). In this vein, Szuprowicz (1996) [26] articulated two different levels of interactivity: 1) "user-document interactivity" at a low level, where users cannot participate in manipulating the content of the mediated environment (i.e., browsing through hypertext) and 2) "user-system interactivity" at a high level, where users can change the content (i.e., query the search engine). Accordingly, the current study includes the first dimension, richness of content, in the system-oriented interactivity and the second dimension, active control, in the user-oriented interactivity. The media are made more interactive by how rich the presented information is and how various formats of information are prepared to enhance the understandability and playfulness for the users. In other words, users may be encouraged to actively surf the website or even try to participate in activities suggested by the service providers when the prepared content is not only in text format but also in photographs, video, and even games related to the content [27]. Burgoon and colleagues (2000) [28] also emphasized the "information-rich" dimension, which can arouse users' curiosity in and understandability of various types of content such as videos and realities.

In the mobile internet, *contextual services* are available to users. That is, service providers can offer unique content by using situating computing technologies. Since a mobile device stays with its owner at all times, a supplier approved by the owner can chase the user and gather all the usable information it needs [13]. A user can enjoy automatically updated content based on his or her own information as well as that of others due to situating computing, which can detect the specific context (e.g., user location) and interpret the given context information [29]. Choi (2007) [30] referred to these kinds of services as "proactive" communication on the mobile internet, in contrast to "reactive" communication on the fixed broadband. Nowadays, other users' situations, as the more developed form, are applied automatically on a real-time basis to the updating of the content. Even though the users' information is used for contextual services, users would assume that this was a service provided to them by the system since they did not actively manipulate the interaction. Therefore, contextual service is also included in system-oriented interactivity.

2.2. User-oriented Interactivity

As discussed in a previous section, the second dimension of content-related interactivity, users' active control, is considered to be a higher level of interactivity. According to McMillan (2002) [19], a higher level of human-to-content interaction can be achieved when users can create and modify content actively and easily in a mediated interface. In addition, since specific functions are typically on every website nowadays, recent researchers have tended to choose perceptual terms such as users' control over content to determine the level of interactivity of a certain website [13, 31]. Therefore, active control was included in user-oriented interactivity in the current study.

Two-way communication with service providers of fixed broadband has been described as a way for suppliers to communicate with users in "post-and-response" (*e.g.*, feedback, email) or in "real-time" format (*e.g.*, chat room) [32]. Some researchers have considered service suppliers as subjects who respond to users' requests, with service suppliers having stronger control over the communication [11, 7, 17, 8, 18, 13]. They described this quality as "responsiveness" to users. As the internet advances, however, users might not want to remain as mere objects waiting for suppliers' responses; they might want to achieve equality of control over the communication [33]. Also, the introduction of Web 2.0 applications has made consumers ask e-retailers for more human-to-human conversations on the internet [34]. Accordingly, researchers have suggested additional qualities such as two-way communication or reciprocity for the exchange of information [9, 28, 14, 10, 31].

Besides communication with suppliers, users seem interested in communicating with other users. With this perspective in mind, interpersonal communication between users has been addressed in several studies (*e.g.*, [11, 7, 16, 8]). As SNSs (Social Network Services) become more popular, users who are exposed to any type of information are becoming willing to share it even with total strangers [35]. Thus, the advance of related technologies has removed the physical and psychological distances among mobile internet users, which has resulted in greater importance being attached to the interaction among users.

The era of the mobile internet has brought about many changes. Now that all the related participants, including users and suppliers, are "always-on," the inherent time-lag of the post-response formats has been eliminated. That is unless a supplier does not want to respond, there is no technical limitation keeping the supplier from responding. Additionally, since the mobile internet is usually accessed through a mobile device, if users have a question for suppliers, they can call them immediately, which leads to the ultimate form of interaction being achieved, which is more similar to the face-to-face conversation [36]. Thus, Gao and colleagues (2009) [2] explained that mobile phones are naturally meant to enhance two-way communication. In addition, various types of free mobile instant messaging applications may help users to communicate with others more easily and at no cost. Taken together, when it comes to the human-to-human interactivity of the mobile internet, both two-way communication between suppliers and users and inter-user communication should be considered at the same time.

This discussion of the multi- dimensions of interactivity and the hierarchical order, from system-oriented interactivity to user-oriented interactivity, has led to the following hypotheses:

H1: Feature-based interactivity of the mobile Internet site will be positively related to the level of perceived m-interactivity.

H2: Synchronicity of a mobile website will positively influence the multiple dimensions of user-oriented interactivity (Active control, Two-way communication, Interpersonal communication).

H3: The rich content of a mobile website will positively influence the multiple dimensions of user-oriented interactivity (Active control, Two-way communication, Interpersonal communication).

H4: The contextual services of a mobile website will positively influence the multiple dimensions of user-oriented interactivity (Active control, Two-way communication, Interpersonal communication).

2.4. Interactivity, Value, Satisfaction, and Loyalty

The relationships among perceived quality (performance), value, satisfaction, and loyalty have been widely examined and supported by previous studies in such contexts as transportation (*e.g.*, [37]), sports and leisure (*e.g.*, [38]), healthcare (*e.g.*, [31]), and retailing (*e.g.*, [39], [40]). Since perceived interactivity in the current study can be interpreted as the perceived quality or performance of mobile websites in terms of interactivity, the conceptual model of this study also follows perceived interactivity, value, satisfaction, and loyalty relationships.

First, previous studies have suggested that quality or performance positively influence perceived value (*e.g.*, [41, 42, 40]) and satisfaction (*e.g.*, [4, 42]). In addition, positive impacts of interactivity on perceived value (*e.g.*, [43, 21]) and on satisfaction (*e.g.*, [21]) have been suggested. Studies in consumer behavior have included utilitarian value and hedonic value as two main components of consumer perceived value [44]. Also, consumer perceived value has been posited as leading to satisfaction [45, 46]. In other words, perceived interactivity is expected to have both direct and indirect (mediated through hedonic and utilitarian value) relationships with satisfaction. Finally, a positive relationship between consumer satisfaction and loyalty has also been shown [47]. Therefore, the following hypotheses have been proposed.

H5: Active control of a mobile website will positively influence the hedonic and utilitarian values of the mobile website.

H6: Two-way communication with a service provider of a mobile website will positively influence the hedonic and utilitarian values of the mobile website.

H7: Interpersonal communication with other users of a mobile website will positively influence the hedonic and utilitarian values of the mobile website.

H8: Active control of a mobile website will positively influence the level of satisfaction with the mobile website.

H9: Two-way communication with a service provider of a mobile website will positively influence the level of satisfaction with the mobile website.

H10: Interpersonal communication with other users of a mobile website will positively influence the level of satisfaction with the mobile website.

H11: Hedonic and utilitarian values of a mobile website will positively influence the level of satisfaction with the mobile website.

H12: Satisfaction with a mobile website will positively influence intended loyalty toward the mobile website.

3. Methodology

3.1. Instruments

The six constructs of mobile interactivity focused on in the current study are synchronicity, rich content, contextual service, active control, two-way communication with a service provider of a mobile website, and interpersonal communication with other users of a mobile website. The items for the six constructs of perceived mobile interactivity were drawn from the past literature regarding perceived interactivity. From Liu's (2003) [14] research regarding the perceived

interactivity of a website for PCs (fixed broadband internet), three constructs, synchronicity (*e.g.*, “I can obtain the information I want without any delay”), active control (*e.g.*, “I feel that I have a lot of control over my surfing experience of the mobile site”), and two-way communication (*e.g.*, “The mobile site seems to facilitate two-way communication between the visitors and the site”) were captured. The rich content was taken from McMillan and Hwang’s (2002) [15] engagement scale. While this engagement scale has six items explaining the richness of content and other dimensions of interactivity, only the three items asking for the richness of content (*e.g.*, “The mobile site provides a variety of format of content”) were drawn. Finally, contextual services from Lee (2005) [13] (*e.g.*, “The mobile site provides me with optimal information or service that is contextually relevant to me based upon where I am and what I am interested in”) and interpersonal communications from Gao et al. (2009) [2] (*e.g.*, “I can respond to the mobile site and get a reply like I am communicating with a real person”) were included as mobile- specific constructs.

Concerning the dependent variables, hedonic and utilitarian shopping values were assessed based on Babin, Darben, and Griffin (1994) [48]. Satisfaction was captured from Teo *et al.*, (2003) [43]. In Teo *et al.*,’s (2003) [43] original research, satisfaction was determined using seven statements explaining satisfaction with the Internet surfing experience. Three statements explaining controls over the experience were deleted since the meaning overlapped with the construct of perceived interactivity, namely, active control. Lastly, loyalty was assessed based on four items from Gremler (1995) [49]. All the statements in the questionnaires were measured on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

3.2. Online Survey

An invitation message with a link to a self-administered survey webpage was sent to 90 smartphone users who were enrolled in a course on market research methods at a medium-size women’s university in South Korea. Also, they were asked to forward the invitation message to other acquaintances who had smartphones. During the 15-day period of data collection, 407 smartphone users began answering the questionnaire, but only 303 of them finished it. Then after weeding out the cases of incomplete responses, 273 cases remained. The demographic and mobile usage information of the participants is portrayed in Table 1.

Before answering the questionnaire regarding interactivity as well as its effects such as value and satisfaction, participants were asked to bear in mind the mobile website that they thought of as being the most interactive website among all the websites that they usually accessed. While 73% of respondents chose portal sites and SNS services as the object of the survey, the others chose mobile commerce sites (17%), banking (9%), and other.

Table 1. Profiles of Respondents (N=273)

Variables	Frequency (%)	Average (S.E)
Demographic	Age (years)	28.18(8.39)
	Gender	
	Male	76 (27.8)
	Female	197 (72.2)
Mobile Usage	Occasion	
	Moving (Commuting)	192 (27.8)
	Waiting	214 (31.0)
	At home	167 (24.2)
	For work/study	60 (8.7)

Traveling	57 (8.3)	
Regularly visiting sites		
Banking	105 (13.9)	
Portal	238 (31.6)	
Other commerce	91 (12.1)	
Games	10 (1.3)	
SNS	244 (32.4)	
Social commerce	65 (8.6)	
Other	1 (0.1)	
Experience (years)		3.26 (0.8)
Time spent (hours/day)		4.33 (1.30)

4. Results

4.1. Reliability and Validity Analysis

First, the Cronbach's alpha of the ten factors was greater than .70 as the index of good reliability [50]. Regarding validity, while AVE that exceeds .50 in a multiple construct model is generally accepted to have good convergent validity [51], the values of AVE for the ten constructs were calculated as being between .645 and .896. Also, all CRs of the six factors were over .7, showing a good convergent validity [52]. Likewise, to test discriminant validity, the square root of the AVEs was compared to factor correlation coefficients (Table 2). Since the square root of AVE for each factor was larger than its correlation coefficient with other factors, this confirms that the six-factor model can be considered to have good enough reliability and discriminant validity for testing the hypotheses.

Also, the current study administered SEM using AMOS 20.0 to test a structure model from H2 to H12. The data analysis proceeded in two steps: 1) CFA (confirmatory factor analysis) to check the latent measurement model of the perceived mobile interactivity and 2) SEM (Structural Equation Modeling) (H2-H12) to test the hypotheses [56] (Anderson & Gerbing, 1988). The results of the CFA including the standardized item loadings, Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's alpha values, are presented in Table 2.

Table 2. Standardized Loadings, C.R., AVE, and Alpha

Factor	Item	Standardized Loadings	C.R.	AVE	Alpha	Reference
Synchronicity (SYN)	SYN1	0.727	2.708	0.745	0.730	Liu (2003)
	SYN2	0.415				
	SYN3	0.714				
Rich Content (RI)	RI1	0.96	2.314	0.645	0.784	McMillan & Hwang (2002)
	RI2	0.567				
	RI3	0.489				
Contextual Services (CON)	CON1	0.752	2.999	0.896	0.822	Lee (2005)
	CON2	0.907				
	CON3	0.806				
	CON4	0.553				
Active Control (AC)	AC1	0.738	2.784	0.774	0.64	Liu (2003)
	AC2	0.684				
	AC3	0.757				
	AC4	0.575				
	TW1	0.804	3.294	0.868	0.802	
	TW2	0.893				

Two-way communication (TW)	TW3	0.732				
Interpersonal Communication (IC)	IC1	0.824	3.229	0.828	0.804	Gao, et al. (2009)
	IC2	0.756				
	IC3	0.548				
	IC4	0.8				
Hedonic Value (HV)	HV1	0.791	3.134	0.887	0.828	Barbin, et al. (1994)
	HV2	0.799				
	HV3	0.679				
	HV4	0.633				
	HV5	0.637				
Utilitarian Value (UV)	UV1	0.621	2.457	0.885	0.771	
	UV2	0.512				
	UV3	0.777				
	UV4	0.992				
Satisfaction (SAT)	SAT1	0.751	2.584	0.854	0.814	Teo, et al. (2003)
	SAT2	0.648				
	SAT3	0.771				
Loyalty (LOY)	LOY1	0.943	3.605	0.861	0.784	Gremler (1995)
	LOY2	0.749				
	LOY3	0.636				

4.2. ANOVA: Feature- Oriented vs. Perception- Oriented

As shown in Table 3, the level of all the perceived interactivity turned out to be significantly different between the level of the high interactive mobile sites and the level of the low ones (*e.g.*, Synchronicity: MHigh = 5.552, MLow = 4.907; F-value = 24.69, p = .00), except for the contextual offers (MHigh = 3.807, MLow = 3.881; F-value = .21, p = .647). This finding implies that contextual offers, which is the highest level of technology involving mobile services, were not likely to differentiate between high and low interactive mobile sites.

Table 3. Results of ANOVA

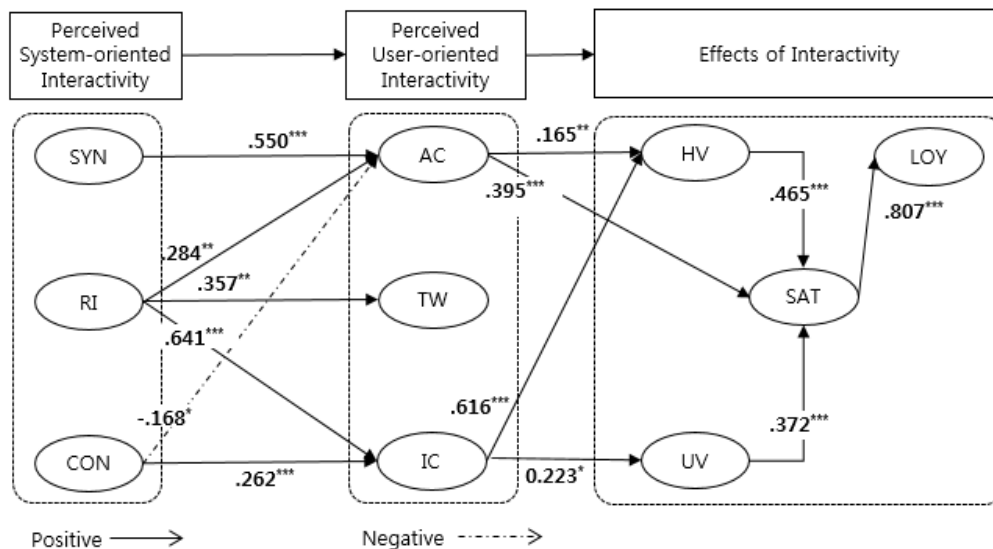
Perceived Interactivity	High Interactivity N=126		Low Interactivity N=147		Results	
	Mean	S.D.	Mean	S.D.	F-value	Sig. (p)
SYN	5.552	1.019	4.907	1.112	24.690	.00
RI	5.576	1.155	4.797	1.248	35.213	.00
CON	3.807	1.262	3.881	1.368	.210	.647
AC	5.269	1.089	4.487	1.156	8.232	.004
TW	4.256	1.328	3.884	1.225	5.791	.017
IC	4.073	1.462	3.746	1.365	3.640	.057

Note. SYN: Synchronicity, RI: Rich contents, CON: Contextual services, AC: Active control, TW: Two-way communication with service providers, IC: Interpersonal communication with others, HV: Hedonic value, UV: Utilitarian value, SAT: Satisfaction, LOY: Loyalty

4.2. Structural Equation Modeling Analysis

Finally, several indices were simultaneously evaluated, as suggested in the past literature [54], in order to assure model fit appropriateness. The analysis yielded adequate model fit

statistics: $\chi^2/df=2.15$, $p < 0.001$, CFI= .85, TLI = .83, IFI = .94, RMSEA = .65. While SYN appeared to have significant influence on AC only ($\beta_{\text{SYN-AC}} = .55$, t-value = 5.35, $p = .00$), RI turned out to have significant influence on all of the user-oriented interactivity such as AC ($\beta_{\text{RI-AC}} = .284$, t-value = 2.83, $p = .05$), TW ($\beta_{\text{RI-TW}} = .357$, t-value = 3.054, $p = .002$), and IC ($\beta_{\text{RI-IC}} = .641$, t-value = 5.747, $p = .00$). Although CON showed significant impacts on IC and AC at the same time, the relationship with IC ($\beta_{\text{CON-IC}} = .262$, t-value = 3.696, $p = .00$) was positive, whereas the other relationships with AC ($\beta_{\text{CON-AC}} = -.168$, t-value = -2.439, $p = .015$) were negative. Among the direct outcomes of user-oriented interactivity toward value and satisfaction, AC turned out to have significant impacts on hedonic value ($\beta_{\text{AC-HV}} = .165$, t-value = 2.656, $p = .008$) and satisfaction with the mobile site ($\beta_{\text{SYN-AC}} = .395$, t-value = 6.201, $p = .00$). Also, IC was likely to have significant and positive influences on both HV ($\beta_{\text{IC-HV}} = .616$, t-value = 7.066, $p = .00$) and UV ($\beta_{\text{IC-UV}} = .223$, t-value = 2.374, $p = .018$). Otherwise, TW seems to have had no significant impact on the expected effects of interactivity. Last, HV ($\beta_{\text{HV-SAT}} = .465$, t-value = 5.534, $p = .00$) and UV ($\beta_{\text{UV-SAT}} = .372$, t-value = 4.723, $p = .00$) were found to be significant determinants of satisfaction with mobile sites, as expected. And as generally accepted, SAT seems to have been a strong influencer on intended loyalty toward mobile websites ($\beta_{\text{SAT-LOY}} = .807$, t-value = 8.692, $p = .00$).



Note. SYN: Synchronicity, RI: Rich contents, CON: Contextual services, AC: Active control, TW: Two-way communication with service providers, IC: Interpersonal communication with others, HV: Hedonic value, UV: Utilitarian value, SAT: Satisfaction, LOY: Loyalty

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1. Structural Equation Modeling Results

Table 4. Results of the Structural Equation Model

	Hypothesis	Proposed Model Paths	Standardized coefficient	S.E	C.R.	
Second Order of Interactivity	H2-1	SYN →	AC	0.550***	0.109	5.348
	H2-2		TW	-.068	0.147	-.628
	H2-3		IC	-0.173	.130	-1.801
	H3-1	RI →	AC	0.284**	0.085	2.831
	H3-2		TW	0.357**	.126	3.054
	H3-3		IC	0.641***	0.121	5.747

	H4-1			AC	-.168*	0.058	-2.439
	H4-2	CON	→	TW	-.144	.086	-1.803
	H4-3			IC	.262***	0.077	3.696
	H5-1			HV	.165**	.066	2.656
	H5-2	AC	→	UV	.048	.042	.669
	H8			SAT	.395***	.045	6.201
Direct	H6-1			HV	-.007	.063	-.093
Outcome of	H6-2	TW	→	UV	-.152	.042	-1.676
Interactivity	H9			SAT	.094	.038	1.360
	H7-1			HV	.616***	.073	7.066
	H7-2	IC	→	UV	.223*	.043	2.374
	H10			SAT	-.091	.049	-1.019
Indirect	H11-1	HV	→	SAT	.465***	.055	5.534
Outcome of	H11-2	UV			.372***	.094	4.723
Interactivity	H12	SAT	→	LOY	.807***	.107	8.692

Note. $\chi^2_{602} = 1296.45$. $p = .00$; CFI = .85; TLI = .83; RMSEA = .065

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Discussion & Implication

5.1. Reliability and Validity Analysis

The current study attempted to extend the theoretical framework of m-interactivity by examining the impacts of m-interactivity on satisfaction as well as loyalty mediated by hedonic and utilitarian values. By checking multiple dimensions of the perceived interactivity of mobile websites through CFA, we confirmed the second order structure between system-oriented and user-oriented interactivity dimensions, as expected from the previous literature in the fixed broadband internet.

When it comes to the second order structure of perceived interactivity in mobile websites, the richness of content was the most influential system-oriented interactivity dimension, and it positively influenced all three dimensions of the user-oriented interactivity (*i.e.*, active control, two-way communication with service providers, and interpersonal communication). In terms of contextual offers, while the relationship to interpersonal communication was significant and positive, the impact on active control was significant but negative. Since contextual offers were mostly provided by service providers automatically with GPS and other technologies without users' control, respondents seemed to feel as though they had lost control over their activities on the mobile websites.

Lastly, synchronicity was shown to be the most powerful and positive determinant of active control, although synchronicity was found not to have significant relationships with the other two communication-related interactivities with service providers as well as with other users. That is, when the speed of the mobile websites is extremely fast, the communication with others could be perceived as being relatively slow even for synchronous, real-time communications because of the time the other party spends typing, etc. Likewise, it is natural that users of smartphones may think that the speed of loading and reacting to a click is more closely related to the mobile carriers rather than to the service providers of mobile sites.

Regarding the relationships among user-oriented interactivity, values, and satisfaction, active control has positive impacts on hedonic value as well as satisfaction with mobile websites. In addition, interpersonal communication was likely to increase the level of hedonic value as well as utilitarian value at the same time. On the other hand, two-way communication with service providers turned out to have no significant influences on utilitarian and hedonic values or on satisfaction. Mobile users may perceive hedonic value when they have control over all the activities on the website, rather than when

communicating with service providers. Most users of a mobile website would only interact with service providers when they cannot find the information or products they need or when they have problems or complaints. Therefore, the insignificant impacts of two-way interactivity with service providers might not necessarily mean that two-way interactivity with service providers do not affect the good results of interactivity, but that the situations for which users need to contact the mobile service providers lead them to perceive it less critical. Accordingly, a separate future study on a case of service failure might give a different result for the relationship between two-way interactivity with service providers and also the consequences. While neglecting communication with service providers, mobile users seem to cherish interpersonal communication, which increases hedonic as well as utilitarian values. Interpersonal communication was not shown to be a direct predictor of satisfaction with mobile websites; however, its impact on satisfaction was significantly mediated by perceived values. As expected, satisfaction was the most powerful predictor of loyalty toward mobile websites.

5.2. Limitation and Future Research

Since the sample collection was a snowball one starting with female college students, the sample included more women than men. In order to improve the generalizability of the results of the current study, similar studies with a more balanced sample would be helpful. Similarly, the results of this study could be compared to those of other cultures where mobile device usage is different from in South Korea. In addition, it would be interesting to examine if there are any differences in the role of m-interactivity across the consumer decision-making process. For example, when consumers access mobile sites to solve their problems at the post-purchase stage, the role of two-way communication in this instance could be more important than we found in our study.

Although the current study is not without limitations, the current study has valuable implications. The results of the current study show the importance of interpersonal communication among users on mobile websites. So it would provide useful implications for mobile website managers to examine which interactivity features enhance users' preferences in communicating with other users. Also, the current research demonstrates that features related to contextual services are still rare on many mobile websites, and users feel contextual services lower their active control through increasing their interactivity with other users. Therefore, future research also needs to explore an ideal contextual service offer which can minimize users' feeling of losing control while still keeping positive perceptions.

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