The Effects of Customization on Satisfaction with Mobile Systems

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ABSTRACT

In the context of mobile commerce, many technology constraints, such as small screen displays and limited bandwidth, impede user adoption. It is crucial to customize interfaces, content, commerce transactions, and communication to meet mobile users' need. This paper explores customer satisfaction with mobile services by expanding the expectation and desire disconfirmation model and incorporating constructs of perceived customizability and self-efficacy. This paper proposes a research model and method to validate the effect of perceived customizability on positive perception of service performance, expectation and desire disconfirmation, and satisfaction.

INTRODUCTION

This paper examines how customization affects user satisfaction in a mobile context. As mobile services become more popular, designs for interface and content need to accommodate mobile constraints, such as small screen and limited bandwidth, inherent in wireless handheld devices and mobile technology. Customization helps users to choose relevant information and interface features for information delivery on wireless handheld devices. We expand on the expectation and desire disconfirmation model (Khalifa and Liu, 2001, 2002) to investigate the effect of customization on customer satisfaction with mobile services. Our proposed research model introduces a construct of perceived customizability and incorporates self-efficacy as its antecedent. The objective of this study is to validate twelve hypotheses developed from the research model. This paper discusses this research in four sections: (1) a review of background literature on satisfaction, customization, and mobile commerce issues; (2) discussion of a new construct of perceived customizability and its antecedent; (3) the proposed research model and hypotheses; (4) methodology and measurement development. By presenting an expanded research model, this paper contributes to theory building for examining the role of customization in mobile customer satisfaction.

BACKGROUND LITERATURE

Customer Satisfaction

Customer satisfaction means satisfying the customer's need and desires (Keith, 1960). As explained by the expectation disconfirmation theory, satisfaction is determined by the intensity and direction of the gap between expectation and perceived performance (Oliver and DeSarbo, 1988). A customer is more likely to be satisfied if the service performance meets (confirmation) or exceeds (positive disconfirmation) his or her expectation. Conversely, a customer is more likely to be dissatisfied if the service performance falls below his/her expectations (negative disconfirmation).

Other researchers consider desire as an additional comparison standard in disconfirmation process (Spreng et al., 1996). Desire is inner emotional needs and wants. Desire can be high while expectation can be poor based on an individual's past experience. Under the desire confirmation theory, actual performance might meet expectation, but can fall below desired performance (negative disconfirmation), which is likely to lead to dissatisfaction.

Recent studies by Khalifa and Liu (2001, 2002, and 2003) reveal that both expectation and desire disconfirmation play important role in explaining satisfaction with Internet-based services. Their research confirms that the size of the gap between customers' perception of service performance and their pre-adoption expectations and desires affects satisfaction with online services.

Mobile Services

The idea of mobile commerce is to deliver web content and services to wireless handheld devices. The mobile web enables users to perform time critical tasks anytime and anywhere. Anckar and D'Incau (2002) categorize mobile benefits in two groups: wireless values and mobile values. Wireless values refer to the use of wireless technology. Mobile values arise from the mobile use of technology in meeting users' time-critical needs; spontaneous needs; entertainment needs; efficiency needs; and mobility needs.

Regardless of the benefits mobile services deliver, many constraints hinder user adoption. The common constraints in mobile computing are form factors, quality of network service, and mobility. Form factor constraints include small screen for content display, difficult and slow data input. The quality of network service is hampered by unreliable network connectivity and limited bandwidth. This is particularly a problem with transactional applications in m-commerce. In regards to the above constraints, researchers have emphasized the need for identifying usability guidelines for small screen interface design (e.g., Chan et al., 2002; Chan and Fang, 2003).

Customization

Customization is the ability to tailor products and services according to user preferences. Through customization, companies can create the perception of interest in customer's needs (Shostak, 1977) and higher quality of services and products, because companies can better match customer to desired product (Ostrom and Iacabucci, 1995). For Internet based services, customization allows users to explicitly specify their preferences and tailor products and services according to these preferences. Johansson et al (2001) reveal that customization provides users perceived control, which is a more effective approach to gain satisfaction. Therefore, an online service or e-commerce site may achieve better satisfaction when the site enables users to control their choices for products and services.

In the mobile context, content adaptation (Zhang, 2003; Zhou and Chan, 2003) can minimize the constraints limiting handheld devices and

contribute to the more effective use of the mobile Web. Unique mobile features have been implemented mostly by content adaptation. The concept of customization could therefore be applied to content display, interface presentation, navigation, links and shortcut, and loyalty programs for mobile application delivery on handhelds.

PERCEIVED CUSTOMIZABILTY AND ITS ANTECENDENT

According Anckar and D'Incau (2002), mobile commerce delivers mobile values to customer for time critical and spontaneous needs. Therefore, there is a difference in satisfaction model between electronic commerce and mobile commerce. Base on past researches (Chan et al., 2002; Chan and Fang, 2003), mobile constraints hinder the efficient delivery of mobile benefits. We believe providing user control customization ability can minimize mobile constraints. By delivering user specified content and functions, mobile services can display relevant data customized to individual users. User-customized transactions can minimize mobile input and improve mobile navigation. This perceived customizability provides control, which contribute to overall mobile satisfaction.

The Construct of Perceived Customizability

In this study, we propose a new construct of perceived customizability, which is defined as "customer perception of the extent that he or she can customize and control the features of an online or wireless service or site." The emphasis of customizability is on customer-initiated actions. Such actions may give users a greater sense of control over the process of online services and lead to greater satisfaction and intention to return (Zo, 2003). By providing user control with a customizable system, the delivery of content can achieve their goal more flexibly and efficiently. In terms of user interface design, Bunts (2004) points out that the adaptable interfaces, which places users in control of customizable features, are more preferable than adaptive interfaces for application-initiated customization. The adaptable approach gives user better control, more transparency and predictability. This study (Bunts, 2004) further demonstrates that offering customization options upfront improved the user experience, particularly for experienced users. Novice users were more likely to take advantage of adaptable interfaces in later interactions with the site.

The dimensions for customizability may involve customizable features for customer acquisition, sales and services, and retention (Chan and Lam, 2004). In the mobile context, user ability to customize and control the following features may decrease technical constraints and increase user satisfaction:

- Customized content;
- Customized products / services;
- Customized transactions and processes;
- Customized menu options;
- Customized interface display;
- Customized menu hierarchy;
- Customized loyalty programs;
- Customized navigation;
- Choices of form factors;
- Customized modality for input and output (such as aural versus visual); and
- Customized communication options.

Self-Efficacy as an Antecedent

Unfamiliarity with handheld devices and mobile services may affect a customer's self–efficacy in taking advantage of customization facilities offered by mobile services. Bandura (1986) defines self-efficacy as a person's judgment of their capability to organize and execute courses of action required to attain designated types of performances. Self-efficacy is concerned not with the skills one has but rather with judgments of what one can do with whatever skills one possesses. According to Compeau et al. (1995), high magnitude of self-efficacy will be able to accomplish

more difficult tasks and more likely to use technology. Therefore, self-efficacy may be an antecedent of customizability.

RESARCH MODEL AND HYPOTHESES

Building on Khalifa and Liu's (2002) expectation and desire disconfirmation model, our research model incorporates the constructs of perceived customizability and self-efficacy, as shown in Figure 1. Current state of mobile services and constraints of wireless technologies may make customers to hold different expectations and desires about mobile services. Therefore, they may form different comparison standards for perceived performance and satisfaction. By allowing customers to control customization of content, products, transaction processes, and interfaces, a mobile service can improve their experience and satisfaction. However, their self-efficacy of wireless technology could affect their perception of the level of customizability of a mobile service. Therefore, our research model proposes that four constructs, "expectation disconfirmation," "desire disconfirmation," "perceived performance," and "perceived customizability," are the main determinants of customer satisfaction in the context of mobile services. Figure 1 depicts the structural model and 12 hypothesized relationships.

Based on the review of aforementioned prior research, our research model postulates twelve hypotheses:

Self-efficacy is the antecedent of perceived customizability. The higher the customer's self-efficacy of his or her ability to use the customization features for a mobile service, the more positive is his or her judgment on using customization facilities, and thus results in positive perceived customizability. Therefore, we postulate that:

H1: Self-efficacy of using customization facilities will have a positive effect on perceived customizability of a mobile service.

According to Khalifa and Liu (2002), both customer desires and expectations form comparison standard for perceived performance at adoption in the disconfirmation process. When the level of pre-adoption expectations or desires is high, these comparison standards are less likely to be reached by the perceived performance of a mobile service. Therefore, the higher the pre-adoption expectations or desires, the more negative the disconfirmation.

H2: Pre-adoption expectations have a negative effect on expectation disconfirmation at adoption of a mobile service.
H3: Pre-adoption desires have a negative effect on desire disconfirmation at adoption or a mobile service.

Figure 1. The Research Model
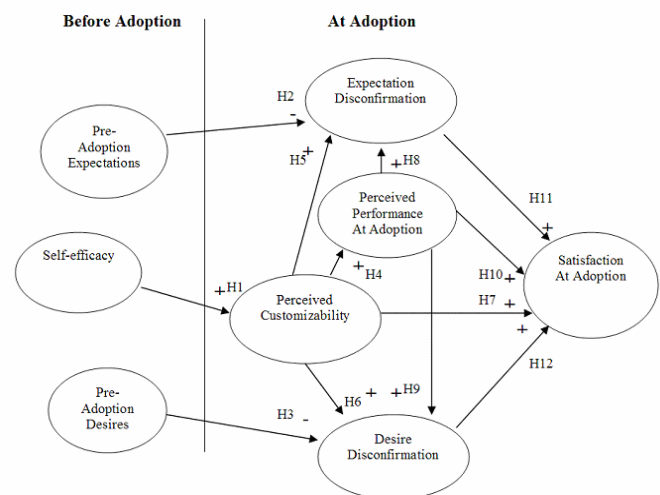
A high level of perceived customizability implies that the customer can take advantage of customization facilities to make the mobile services more usable and meeting his/her needs. Therefore, customization can lead to positive perceptions of a mobile service's performance.

H4: The level of perceived customizability has a positive effect on perceived performance of a mobile service at adoption.

The level of perceived customizability may also contribute to the customer's positive expectations and desire disconfirmation. A customer's ability to tailor content, interfaces, and communication means for a mobile service may improve the site's usability and usefulness. Consequently, customization features may help bridge the gaps between expectations and service performance, as well as the gaps between desires and service performance. Therefore, we postulate the following:

H5: Perceived customizability has a positive effect on expectation disconfirmation of a mobile service at adoption.
H6: Perceived customizability has a positive effect on desire disconfirmation of a mobile service at adoption.

Perceived customizability may have a positive impact on customer satisfaction in regards to his/her adoption of mobile services. The user-initiated customization gives users a greater sense of control that leads to higher satisfaction. Therefore, we postulate that perceive customizability will be one of the determinants of customer satisfaction.

H7: Perceived customizability has a positive effect on satisfaction of a mobile service at adoption.

The remaining five hypotheses (H8 to H12) are derived directly from studies by Khalifa and Liu (2002, 2003). A high level of perceived service performance at adoption leads to positive expectation disconfirmation (H8) and desire disconfirmation (H9) because good service performance helps to match or exceed customer expectations and desires. Perceived service performance at adoption (H10), expectation disconfirmation (H11), and desire disconfirmation (H12) contribute directly to positive, overall customer satisfaction at adoption. Based on the result of previous studies (Khalifa and Liu, 2003; Spreng et al., 1996; Patterson et al. 1997), the effect of perceived performance on satisfaction is not fully mediated by expectations or desire disconfirmation. When desires or expectations are low, the role of perceived performance becomes more dominant in explaining customer satisfaction.

H8: Perceived performance at adoption has a positive effect on expectation disconfirmation of a mobile service at adoption.
H9: Perceived performance at adoption has a positive effect on desire disconfirmation of a mobile service at adoption.
H10: Perceived performance at adoption has a positive effect on satisfaction with a mobile service at adoption.
H11: Expectation disconfirmation at adoption has a positive effect on satisfaction with a mobile service at adoption.
H12: Desire disconfirmation at adoption has a positive effect on satisfaction with at adoption.

The results from Khalifa and Liu's (2002) desire disconfirmation model indicate that there is still room for other factor(s) to explain satisfaction. Our proposed research model suggests that the construct of perceived customizability may be an additional determinant for expectation disconfirmation, desire disconfirmation, and overall customer satisfaction at adoption.

METHODLOGY

We will validate these research hypotheses by using a mobile portal system designed for university students. The system has two components: the portal and interfaces for customization. The mobile portal is delivered on a PDA interface. Based on results of student interviews,

we are developing a mobile portal that offers mobile services for personal calendar with predefined school and class events, personal schedules, customized alerts and notifications, weather, news, movie theatres, and book purchase. A Web user profile interface is designed for the participant to customize his/her preferences for the registered courses, course schedules, interested events, advising appointments, and lab hours. The user can also specify needs for desired services, such as weather information in a zip-code area, news from a preferred source, the movie schedule from predefined theatres, interested categories of book reviews, and the order for presenting links and content on a PDA interface. With the predefined classes and events, daily schedules are automatically presented to the user. Schedules and alert/notifications can be added on the PDA directly. The user can customize alert of schedule by using email, text messages paging, and PDA alert. The user has option to customize portal features anytime during the period of their participation in the study.

Students at a Midwest university will be recruited to participate in this study. Participants will receive a bookstore coupon for their participation. In order to encourage their continued use of the portal system, participants will be offered a loyalty program with additional rewards if they accumulate sufficient number of points over the three-month duration of the study. Winners will be drawn at the end of the project. Table 1 summarizes the research procedure and data collection plan.

At the onset of the study, participants need to register for the system by completing an online questionnaire to provide information about their background, and answer questions regarding their pre-adoption expectations, desires, and self-efficacy toward the mobile-based PDA services. Next, participants will customize their preferences and desired services. Such information will be used to construct customized mobile services and interfaces on the PDA.

During the study, each participant's usage of the portal will be tracked and points are accumulated for a loyalty reward program. Online help is provided on the PDA for the participant to post questions or view frequently asked questions. Each participant needs to access the mobile portal system at least once during the three-month study period and complete an online survey at the end of the usage period to earn online e-coupons and to quality for special loyalty rewards. The second questionnaire is to assess participants' post-adoption expectation and desire disconfirmation, perceived actual performance, customizability, and overall satisfaction with the mobile services. This questionnaire will include a self-reported measure of frequency of usage. In addition, participants who drop out of the study after one visit will have opportunities to specify the reasons for discontinuation. Email reminders, which contain links to user profile update and loyalty program status, will be sent to participants throughout the study period.

Items measuring the research constructs will be based on literature review and our prior usability studies of mobile services (Chan and Fang, 2003; Chan et al., 2002). The first questionnaire contains items on self-

Table 1. Procedure and Data Collection

Steps and Instruments	Data to be collected
1. Participants register for the research project and answer the 1st online questionnaire.	Collect data on the participant's background (gender, age, prior experience), self-efficacy, expectations and desires)
2. Participants choose customization features	Customization features and date/time
3. Participants use the portal system at least once.	Logs on usage, accessed links, frequency of usage, and date/time for customization
4. Participants receive emails about accumulated points and continuous participation.	
4. Participants complete the 2nd online questionnaire upon the completion of their participation (i.e., use the system at least once).	Perceived customizability, perceived service quality, expectation disconfirmation, desire disconfirmation, satisfaction, and self-reported frequency of usage, reasons for discontinuance

efficacy (Compeau, 1995), pre-adoption expectations and desires (Khalifa and Liu, 2003), as well as participant's demographic information and prior experience in using mobile services, The second questionnaire includes items on perceived customizability, perceived performance (Dabholkar et al., 2000) of the portal system, expectation and desire disconfirmation (Spreng et al., 1996, Khalifa and Liu, 2003), and user satisfaction (Oliver, 1988, Khalifa and Liu, 2003). The measurement of expectation and desire disconfirmation involves a comparison of pre-adoption expectation and desire with perceived performance. Items for perceived customizability will reflect participant's perception of his/her ability to customize the portal system's interface, choice of services, communication method, and desired schedule information. A pilot test will be conducted to refine the measurement instruments and the portal systems. Internal consistency and reliability will be validated prior to hypothesis testing.

EXPECTED CONTRIBUTIONS AND CURRENT STATUS

We are currently completing the portal system and the development of questionnaires. Pilot tests of the system and measurements will be the next steps before data collection. We expect that this study will make several contributions to research on customer relationship management and mobile commerce. The new construct on perceived customizability will help researcher to better understand the role customization plays in user adoption of mobile services. The research model helps to expand the theoretical framework of customer satisfaction. Furthermore, this research represents the first effort in applying customer satisfaction research to the mobile context.

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