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ABSTRACT

U-commerce represents "anytime, anywhere" commerce. U-commerce can provide a high level of personalization, which can bring significant benefits to customers. However, customers' privacy is a major concern and obstacle to the adoption of u-commerce. As customers' intention to adopt u-commerce is based on the aggregate effect of perceived benefits and risk exposure (e.g., privacy concerns), this research examines how personalization and context can impact on customers' perceived benefits and privacy concerns, and how this aggregated effect in turn affects u-commerce adoption intention.

Keywords

U-commerce, personalization-privacy paradox, situation dependency, adoption intention

INTRODUCTION

The advancement of new technologies such as radio frequency identification (RFID) and sensor networks has initiated a trend towards ubiquitous computing, which is also called "anytime, anywhere" computing (Lyytinen et al., 2004). In a ubiquitous computing environment, computing devices, applications, networks, and data will be fully integrated and merged (Junglas and Watson, 2006). Almost any physical item can be embedded with computing power to establish a unique and verifiable identity, store a wealth of information, collect observations from the physical world, and sense changes in the environment. Ubiquitous technologies will increasingly form the background of the way we expect things to work (Rusell et al., 2005) and, in that sense, "disappear into the fabric of the world" (Russell et al., 2005) and become part of our daily life.

Ubiquitous computing has enabled a new paradigm of commerce which goes above and beyond any traditional commerce (Junglas and Watson, 2006). This type of commerce is called "ubiquitous commerce", or simply "u-commerce", and is considered to be the ultimate form of commerce (Watson et al., 2002; Junglas and Watson, 2006; Galanxhi-Janaqi and Nah, 2004). U-commerce refers to the ability to interact and transact with anything and anyone, anytime and anywhere (Accenture, 2001). Therefore, u-commerce is pervasive – as it will become a part of everyday life and will be so prevalent that most people would not even notice its presence (Lyytinen et al., 2004; Russell et al., 2005). U-commerce is going to be the next wave in commerce – i.e., after e- and m-commerce (Watson, 2000).

Personalization is the key in u-commerce (Sheng et al., 2005). Technologies used in u-commerce, such as RFID and sensor networks, have the ability to identify, track, and trace objects automatically (Asif and Mandviwalla, 2005; Ohkubo et al., 2005). The use of such technologies has made it technically possible for service providers and merchants to deliver personalized products to their customers based on customers' identities, preferences, and geographical locations (Junglas and Watson, 2006). U-commerce can provide a higher degree of personalization, which can provide additional benefits and value to customers (Junglas and Watson, 2006).

Despite the promising future of u-commerce and the tremendous benefits it can bring to customers, customers' privacy concerns appear to be the biggest obstacle and social issue (Asif and Mandviwalla, 2005). In order to enjoy the benefits of personalization in u-commerce, customers usually need to give up some of their personal information to the service providers or merchants (Roussos et al., 2003). The advancement of technologies embedded and used in the u-commerce environment raises concerns of customers because their personal information not only can be constantly accessed and continuously tracked, but also can be easily disseminated and possibly used in ways unknown to them (Gunther and Spiekermann, 2005).

Customers' privacy concerns can outweigh the benefits of using u-commerce services (e.g., Ohkubo et al., 2005), which in turn influence their intentions to adopt u-commerce. For example, Consumers Against

Supermarket Privacy Invasion and Numbering (CASPIAN) criticized Benetton, an Italian apparel company, about their plan of attaching RFID tags to products, which led to the boycott of those products (Ohkubo et al., 2005).

To the degree that privacy concerns represent an inhibiting factor in customers' intentions to adopt u-commerce applications, it is important to empirically investigate the impact of personalization and privacy concerns on customers' adoption intentions.

CONCEPTUAL FOUNDATIONS

Personalization-Privacy Paradox

Personalization is dependent on two factors: (1) companies' ability to acquire and process customers' information, and (2) customers' willingness to share information and use personalized services (Chellappa and Sin, 2005). Companies would like to obtain as much information as possible about their customers so that they can provide personalized products or services to their customers. Customers, on the other hand, would like to obtain personalized products or services by giving out minimum information (Adomavicius and Tuzhilin, 2005). Despite the benefits personalization can provide to organizations and customers, personalization requires the users to give up some of their personal information to their service provider, which raises privacy issues (Culnan and Armstrong, 1999) and creates a "personalization-privacy paradox" (Awad and Krishnan, 2006).

Personalization-privacy paradox is also evident in u-commerce. In u-commerce, computing devices can be embedded unobtrusively within everyday objects which can potentially transmit and receive information from any other objects. The aim of such technology is to empower users with more flexible and portable applications that can support the capture, communication, recall, organization, and reuse of diverse information (ITU, 2005). Ironically, the same innovative technologies that are necessary for the success of u-commerce also trigger greater privacy concerns in u-commerce (ITU, 2005). Customers' perception of loss of privacy in u-commerce arises mainly from two aspects: (1) they could be accessed or tracked continuously; and (2) the information can be easily disseminated or used (Ohkubo et al., 2005; Gunther and Spiekermann, 2005).

Therefore, finding an optimal balance between the usefulness of personalization and the privacy the customers need to give up in order to receive such services is an important research issue (Adomavicius and Tuzhilin, 2005). This research examines the trade-off effect of personalization and privacy concerns on customers' intentions to adopt u-commerce.

Situation Dependency

The value of a specific technology to a particular customer varies according to the context in which the technology is used. Because a user's concerns and needs vary with the context in which he/she uses the applications, the services that can meet the user's needs in a specific context will provide the best value to the user (Figge, 2004). Such phenomenon is called "situation dependency" (Figge, 2004).

"Situation dependency" has long been recognized by researchers in the consumer behavior area. Belk (1974) adopted a general view of situation as "something outside the basic tendencies and characteristics of the individual, but beyond the characteristics of the stimulus object to be acted upon" (p. 156-157). In other words, a situation includes factors that are particular to a time and place of observation which are external to the individual or the object of consumption, and are likely to influence the user's behavior (Belk, 1975; Cote et al., 1985).

In u-commerce, the purpose is to amplify human activities with new services that can adapt to the circumstances in which they are being used. Therefore, context is the key in u-commerce applications (Coutaz et al., 2005). Because all users' activities take place in time and space, time and location are essential characteristics of context in u-commerce applications. Combined with the identity of the user, these three dimensions portray the customers of u-commerce in a certain situation or circumstance (Cousins and Robey, 2005).

Therefore, situation dependency in u-commerce can be conceived to have three dimensions: identity (the identity of the user), spatiality (the place where the user is using the application), and temporality (the time the user is using it) (Figge, 2004).

There are many ways of categorizing context. In this research, we categorize u-commerce context into two broad categories: emergency context vs. non-emergency context. According to Shen and Shaw (2004), emergency is any natural or human-originated situation that results in or may result in substantial harm to the population or damage to property. Emergency contexts range from minor incidents (such as getting lost in an unfamiliar city) to natural and industrial disasters (such as storms, flooding, and fire), and medical emergencies (such as car accidents or a heart attack) (e.g., Shen and Shaw, 2004; Curry et al., 2004). Using the three dimensions of the concept of "situation dependency", emergency context represents a situation where time is critical, location is important, and user identity is needed.

HYPOTHESIS DEVELOPMENT

Perceived Benefits

Personalization is one of the main characteristics of u-commerce (Junglas and Watson, 2006). Through an empirical study, Sheng et al. (2005) identified personalization as a means to achieve customers' fundamental objectives in carrying out u-commerce, such as convenience, time saving, individualization, and safety. Fundamental objectives are the fundamental reasons or drives for customers to use and adopt u-commerce (Sheng

et al., 2005). Therefore, fundamental objectives dictate what customers want and desire in u-commerce and the aforementioned fundamental objectives represent customers' perceived benefits of personalization in u-commerce.

In line with the concept of "situation dependency" (Belk, 1974; Cote et al., 1985; Figge, 2004), the benefits of personalization in u-commerce to customers vary depending on the context/situation in which the customers are using such services. Since ubiquitous technologies have the capability to identify the location of users, their identities, and their associated preferences, u-commerce applications are especially suitable and useful in emergency situations (Shen and Shaw, 2004; Curry et al., 2004). As defined earlier, an emergency situation represents a situation where time is critical, identity is needed, and specificity of location is important. Therefore, personalization has major implications in emergency situations where appropriate services need to be delivered to the right person, and at the right time and place. Therefore,

H1: The effect of personalization on perceived benefits is greater in emergency than non-emergency contexts.

Privacy Concerns

The personalization-privacy paradox (Awad and Krishnan, 2006) suggests that customers need to give up some of their personal information in order to receive personalized services (Culnan and Armstrong, 1999). When personalization is present, customers are concerned that their personal information will be collected and continuously tracked, and that their information can be easily disseminated (Ohkubo et al., 2005; Gunther and Spiekermann, 2005).

However, customers' privacy concerns vary depending on their purpose or context of using the technology, that is, customers' privacy concerns are "situation dependent" (Belk, 1974; Cote et al., 1985; Figge, 2004). When customers expect emergencies or are placed in an emergency context (where time is critical, location is important, and identity is needed), personalization in u-commerce is less likely to trigger customers' privacy concerns. Therefore,

H2: The effect of personalization on privacy concerns is greater in non-emergency than emergency contexts.

Intention to Adopt

For any rational decision maker, decisions are made based on an evaluation of perceived benefits and costs (Goodhue et al., 1992). A rational decision-maker always wants to maximize benefits and minimize costs.

In u-commerce context, customers want to maximize benefits they can receive from u-commerce. Therefore,

H3: Perceived benefits will have a positive impact on intention to adopt u-commerce.

Privacy concerns are considered the cost of conducting u-commerce. The negative impact of privacy concerns on behavioral intention has been empirically supported in the e-commerce context (e.g., Malhortra et al., 2004). Similarly, we expect a negative relationship between privacy concerns and behavioral intention in the u-commerce context. Thus,

H4: Privacy concerns will have a negative impact on intention to adopt u-commerce.

RESEARCH METHOD

Research Model

The research model for this study is depicted in Figure 1.

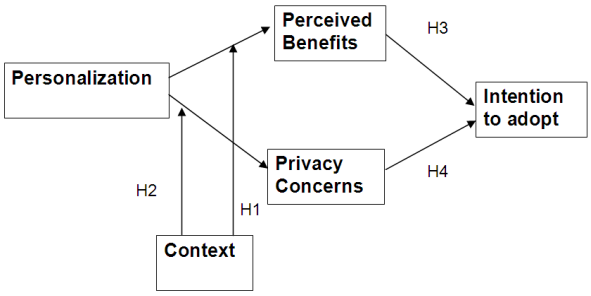

Figure 1: Research Model

Research Design

A 2 (personalization vs. no-personalization) X 2 (emergency context vs. non-emergency context) within-subject factorial design is adopted in this research (see Figure 2).

	Emergency context	Non-emergency context
Personalization	I	II
No-personalization	III	IV

Figure 2: Research Design

Experimental Manipulation

Personalization and context were operationalized using the scenario-based method in which scenarios provide a form or tool to study a possible and plausible future (Bria et al., 2001).

Personalization in u-commerce was operationalized as a weather service that not only provides real-time weather reporting based on the customer's location using voice

recognition systems, but also alerts the customer to serious weather conditions based on the customer's preference.

No-personalization in u-commerce was presented as a weather service in which a user can search for weather information. Customers need to specify the area where they want to know the weather condition using the drop down menus, after which the requested weather information will be displayed on their devices.

Context was operationalized as emergency context vs. non-emergency context. We chose natural disaster (that is, likelihood of tornados) to represent an emergency context, and perfect weather condition (i.e., no likelihood of tornados) to represent a non-emergency situation.

Hence, a total of four scenarios were presented to subjects: 1) Personalization in emergency context; 2) Personalization in non-emergency context; 3) No-personalization in emergency context; 4) No-Personalization in non-emergency context.

Measurement

As privacy concerns and intention to adopt are established constructs, they were measured using instruments adapted from previous studies to fit the u-commerce context (e.g., Smith et al., 1996; Dinev and Hart, 2004).

Perceived benefits were measured using an instrument that was developed based on the interview results from Sheng et al. (2005).

Subjects

The purposive sampling technique is adopted in this study. The reason for choosing purposive sampling is that since u-commerce is still new and visionary at the current stage, very few customers have actually experienced u-commerce applications. Previous studies have suggested that e-commerce users are more likely to adopt mobile commerce, and therefore, are potential mobile commerce users (Anckar and D'Incau, 2002). Similarly, e-commerce and mobile commerce customers are potential u-commerce customers as they are more likely to adopt u-commerce. Therefore, subjects were recruited based on the following criteria: 1) they must have e-commerce experience; or 2) they have experiences in using mobile devices.

Research Procedures

The within-subject design was administrated via questionnaire. Each subject was issued a questionnaire. The questionnaire consists of three parts: 1) Part I surveyed subjects' general attitudes; 2) Part II presented four scenarios in which different u-commerce applications (personalization vs. no-personalization) were offered in various contexts (emergency context vs. non-emergency context). The presentation of each scenario was followed by questions that measured the subject's privacy concerns, perceived benefits, and intention to adopt the u-commerce application just described. Each subject was asked to put himself/herself in the position of one who was experiencing each of the four given scenarios when answering the questions; and 3) Part III captured the subjects' background information (e.g., demographic information and their experience with IT).

DATA ANALYSIS

ANOVA and regression analysis were employed for data analysis. ANOVA was used to analyze the hypothesized interaction between personalization and context and their impact on privacy concerns and perceived benefits. The causal relationships between perceived benefits, privacy concern, and intention to adopt were tested using regression. The hypotheses were supported.

CONCLUSION

This research demonstrates the role of context in assessing customers' perceived benefits and privacy concerns, and the results of this study provide empirical assessment of situation dependency in u-commerce applications.

The results of this study can provide guidelines and suggestions to u-commerce service providers and help them to identify appropriate services to customers in different contexts.

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