



The privacy–personalization paradox in mHealth services acceptance of different age groups [☆]



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ABSTRACT

Mobile health (mHealth) services have gained increasing attention in recent years; however, few studies have focused on the manner in which customers' attributes affect acceptance behavior, for instance, personal privacy concerns and personalization concerns; with even fewer studies on the effects on different age groups. To fill this research gap, our research has developed an attribute–perception–intention model, using the privacy–personalization paradox factors as independent variables that affect mHealth acceptance intention, with trust as a mediator. The age differences of participants were then examined. A survey of 650 subjects in China was conducted to test the proposed research model and hypotheses. The results show the following key findings: (1) perceived personalization and privacy concerns are positively and negatively associated with behavior intention; (2) trust mediates the relationships between perceived personalization, privacy concerns and behavior intention; and (3) age differences are examined in the model, which in this respect differ from previous technology acceptance research. Theoretical and practical implications are also discussed.

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1. Introduction

People in emerging economies worldwide are enjoying gradual improvements in the quality of life and paying more attention to healthcare (Varshney 2014). With the rapid development of the mobile communication industry, there is great interest in the provision of health-related services via mobile telephones or other mobile devices. Such a service is known as 'mHealth'. Accordingly, the use of mobile technology in healthcare, i.e., mHealth services, has gained rapidly increasing research attention in recent years (Zhang et al. 2014).

Whilst the potential benefits of mHealth services are obviously evident, including more efficient health care, availability for remote medical monitoring and consultation, as well as reduced medical costs, literature on mHealth diffusion is rather limited. Moreover, previously constructed models have focused mainly on perceived usefulness; perceived ease of use viewed from the standpoint of the technology acceptance model (TAM); or threat

appraisal and coping viewed from a health behavior perspective. However, the constructs of consumer attributes have been generally ignored (Chellappa and Sin 2005, Sun et al. 2013).

Among the limited studies on this issue, Chellappa and Sin (2005) have partially narrowed the research gap, in examining how consumer attributes, such as privacy concerns and scope for personalization, affect the likelihood of the adoption of personalized services. This study thus discusses the acceptance of mHealth services from the perspective of consumer attributes. Furthermore, we extend the findings of Chellappa and Sin (2005) by investigating the impact of privacy concerns and personalization on adoption intention, mediated by trust. Indeed, trust has been regarded as a form of mediation in many fields, such as social networks (Levin and Cross 2004), service marketing (Auh 2005) and organizational citizenship behavior (Ertürk 2007). However, the mediating role of trust in the relationship between the privacy–personalization paradox and behavior intention has rarely been explored. This paper thus develops an attributes (privacy and personalization) – perceptions (trust) – acceptance intention model to study consumers acceptance behavior in their use of mHealth services. Furthermore, personality changes across a person's lifespan have received widespread attention, becoming an important focal point in social science research and theory. The IS literature has used age as a key moderating variable in technology acceptance

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(Chung et al. 2010, Morris and Venkatesh 2000, Venkatesh 2000, Vijayarathay 2004); however, almost all the moderating effects of age that were previously discussed have focused only on potential adopters' perceptions towards new technology, such as perceived usefulness, perceived ease of use, perceived quality, and perceived self-efficacy. The effects of age on attributes associated with behavior intention has received minimal attention, even though considerable research points to its significant role in technology acceptance (Chung et al. 2010). Moreover, mHealth is using mobile technology to assist in health practices, and thus health technology acceptance behavior should also be considered as a health behavior (Laugesen and Hassanein 2011, Sun et al. 2013). As the age differences in mHealth may relate to technology and health factors, its complexity warrants multiple approaches and perspectives. Nonetheless, to date, age differences in technology and the health comprehensive context are seen to have been rarely explored.

To narrow the aforementioned research gaps, this study aims to address the following research questions:

RQ1: What is the privacy–personalization paradox in mHealth service acceptance?

RQ2: How can privacy and personalization be balanced with consumer trust?

RQ3: Can the privacy–personalization paradox factors provide a different explanation of the intention to adopt mHealth services among the young and the elderly?

To address these questions, an integration model based on the privacy–personalization paradox, and trust and age differences was developed. Next, the model was empirically tested with empirical data. This research has both theoretical and practical implications. From the theoretical perspective, this research contributes to the privacy–personalization paradox by using trust to balance the paradox. This research further tested age differences in the privacy–personalization paradox, which provides very useful perspectives, relating to both health and technology, for both technological acceptance research and the paradox. By incorporating age as a moderator in the attribute–perception–intention model, this study highlights age-related differences in consumers' attributes on mHealth services, and also highlights age-related differences in the technology and health comprehensive perspective. Finally, this research extends mHealth literature by exploring the privacy–personalization paradox and age differences in this emerging service. It can also provide suggestions for practitioners to reduce the paradox and cross the age induced digital divide in mHealth diffusion.

This paper is structured as follows. In the next section, we elaborate on the theoretical foundations of the research. In the following section, the research model and hypotheses of this research are proposed. We then provide an overview of the proposed methodology, followed by a discussion of the results and implications. In the Conclusion, we summarize the findings of our research.

2. Theoretical backgrounds

2.1. Mobile health (mHealth) services

As a subset of eHealth (electronic healthcare), mHealth has many advantages over general eHealth, including increased flexibility, timeliness and mobility (Akter et al. 2011, Akter and Ray 2010). In fact, mHealth can be defined as the utilization of emerging wireless information and communication technologies to transmit healthcare services, which are applicable for service receivers to acquire health services through mobile devices such as mobile phones, smart phones and PADs (Akter et al. 2011,

Istepanian et al. 2006). Characteristically, mHealth can provide three kinds of health services (Phillips et al. 2010): (1) promotion services which are aimed at diagnosis, treatment and management of diseases and delivering treatment or disease management programs to patients; (2) prevention services which are designed for monitoring and intervention of diseases and improving treatment compliance; and (3) procedural services which are aimed at improving health care processes, e.g. appointment attendance, test results and advice notifications. As mobile information and communication technologies are rapidly growing in low income countries, mHealth services are increasingly efficient in dealing with current health problems and have huge potential in these countries (Consulting 2009, Guo et al. 2013, Phillips et al. 2010).

Largely due to the emerging nature of mHealth as a healthcare technology, insufficient research attention has, to date, been devoted to its diffusion. An exception is the study of Cocosila and Archer (2010) which investigated the obstacles (risk factors) of potential users' adoption of mobile information communication technology (ICT) for health promotion from a motivational perspective. By integrating TAM and TPB and examining both their technological and organizational aspects, Wu et al. (2011) studied how healthcare professionals adopt mobile healthcare services. To provide a unified understanding of the acceptance of mHealth services, Sun et al. (2013) introduced health factors from the protection motivation theory to study the consumer acceptance of mHealth services. Guo et al. (2013) explored the enablers and inhibitors of mHealth adoption behavior among the elderly. Akter et al. (2011) studied the establishment of trust in mHealth services and observed its positive impact on consumer trust and the continuance use intention. Based on an expectation confirmation model, Akter et al. (2013)'s in another paper used perceived service quality and perceived trust as key post-adoption beliefs to explore the continued usage of mHealth services for low income populations.

After reviewing the literature on mHealth services, we perceive that most previous research on the acceptance of mHealth services are from a general technology or service perspective and thus do not provide fresh perspectives on mHealth characteristics. In order to add insights to mHealth literature, two significant research gaps need to be filled. First, mHealth can provide more personalized health services than general health services and technologies based on users' personal health information, which may lead to privacy concerns. However, the privacy–personalization paradox has failed to receive adequate attention in mHealth context; and is not concerned with how to balance the paradox. Second, the demographic differences in technology acceptance and health behavior are usually researched as separate areas of focus. As the mHealth service is a combination of technology and health factors, the demographic differences in mHealth related behavior are more complex. However, the demographic differences in mHealth are also under-explored (Zhang et al. 2014).

To narrow these research gaps, this research aims at providing an understanding of mHealth acceptance behavior from a privacy–personalization paradox perspective, focusing on how to balance the paradox with consumer trust and the age differences in the decision process.

2.2. Trust

Trust has been explored in many disciplines because it can reduce uncertainty and induce reliance on, another person or entity, as well as enhance desirable behavior (Gefen et al. 2003), especially in Internet contexts (Salo and Karjaluo 2007). As a popular topic of research, trust has thus been well established (Gefen and Heart 2006). According to Akter et al. (2011), trust in the field of IS can be defined as intentions, beliefs, attitudes or behaviors. Within this broad concept of trust, the two streams of

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