Computers in Human Behavior 67 (2017) 292–302

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

How do credibility and utility play in the user experience of health informatics services?

Dong-Hee Shin [a, *], Seungjo Lee [b], Yujong Hwang [c, d, **]

[a] School of Media and Communication, Chung-Ang University, #1411, Bldg. 303, Heukseok-ro 84, Dongjak-gu, Seoul 06974, South Korea
[b] School of Media and Communication, Chung-Ang University, Heukseok-ro 84, Dongjak-gu, Seoul 06974, South Korea
[c] DePaul University, 1 E Jackson Blvd, Chicago, IL 60604, USA
[d] Kyung Hee University, South Korea

ARTICLE INFO

Article history:
Received 29 November 2015
Received in revised form
12 October 2016
Accepted 7 November 2016
Available online 15 November 2016

Keywords:
Credibility
Trustworthiness
Perceived utility
Time-series cross-sectional study
Health informatics
Health user experience

ABSTRACT

While the use of health informatics is increasing in health care, how it is improving health care and how users accept the services has been little studied, and due to increasing uncertainty, credibility has become a key determinant of health informatics adoption and diffusion. However, little is known about the underlying nature of user trust or how early-stage credibility influences later-stage behavior and experience. To enhance the explanatory power and make it more applicable to health consumers' behavioral intentions, expectation-confirmation theory was extended by adding antecedents and moderating variables from the theory of planned behavior. With health informatics services in place, this study investigates how credibility influence other user perceptions such as perceived utility and how these perceptions together determine user intentions and behaviors concerning health informatics at both the initial and later stages of use. Cross-sectional and longitudinal analysis of these attitudes and behaviors was carried out, and the results showed that perceived utility and credibility are critical at both the initial and later stages in user acceptance of health informatics services. Users' actual experiences modify their perceptions of utility and influence the confirmation of their initial expectations. These results have implications for the fundamental nature of credibility and perceived utility as well as their roles in the long-term sustainability of future health informatics services.

1. How do credibility and utility affect the user experience of health informatics services? what predicts the continuing intention to use a health informatics service?

The increasing reliance on the Internet by the health care community has been shaping the practice of health communication by enabling the use of interactive health communications channels (Yaraghi, Du, Sharman, Gopal, & Ramesh, 2015). Health informatics service (HIS) is an emerging field at the intersection of health informatics, public health, and business; it refers to health services and information delivered or enhanced through the Internet and related technologies (Yan, Wang, Chen, & Zhang, 2016). HIS has the potential to improve the quality, efficiency, and outcomes of health care as well as reduce its costs. Yet HIS systems are not widely available, and even when they are available, they are not properly utilized (Ahlan & Ahmad, 2014). For example, the initial user adoption of HIS innovations is only the first step toward realizing their success (Sherer, Meyerhoefer, & Peng, 2016); their long-term viability will depend on continued user usage (Oghuma, Libaque-Saenz, Wong, & Chang, 2016). Understanding the long-term viability of new HIS contexts therefore requires a dynamic, time-series focus on user beliefs, attitudes, and behaviors rather than a single study of their initial intentions (Venkatesh, Thong, Chan, Hu, & Brown, 2011). Studies have confirmed the need to consider changing beliefs in information technology usage and health information technology adoption (e.g., Kim & Park, 2012; Lin, Wang, Wang, & Lu, 2014; Venkatesh et al., 2011), but few studies have extensively examined the changing nature of user beliefs in HIS adoption.

In light of this gap, this study examines the extent to which users' beliefs about HIS usage change over time and traces how these beliefs influence their intentions and behaviors at both the

* Corresponding author.
** Corresponding author. DePaul University, 1 E Jackson Blvd, Chicago, IL 60604, USA.
E-mail addresses: dshin1030@cau.ac.kr (D.-H. Shin), ijoylee@cau.ac.kr (S. Lee), yujongh@yahoo.com (Y. Hwang).

http://dx.doi.org/10.1016/j.chb.2016.11.007
0747-5632/

early and later stages of use. It focuses on two critical user beliefs: credibility and perceived utility (PU). Holden and Karsh (2010) argued that research on the acceptance of health care technology would benefit from the integration of theoretical approaches with widely researched variables such as PU and trust. Credibility, often referred to as trust, is a user's confidence in the e-service provider's reliability, integrity, dependability, and ability to deliver on expectations (Bhattacherjee, 2002; Pavlou, 2003). This study focuses on these credibility beliefs because of the uncertainties in HIS usage, which have elicited users' trust to be thought among the most important psychological states that influence online behaviors (Pavlou & Gefen, 2002; Pavlou, 2003). Without credibility, users lack the confidence and assurance they need to be willing to be vulnerable to the actions of HIS providers (Gefen, Rigdon, & Straub, 2011).

PU has been identified across diverse technology contexts as a cognitive belief that is salient to technology acceptance (Davis, Bagozzi, & Warshwa, 1989). It has been found to be important in HIS contexts such as mobile health (Gefen, Karahanna, & Straub, 2003; Pavlou, 2003), mobile payment services (Shin, 2009), and mobile instant messaging (Oghuma et al., 2016) and is also related to the dynamic study of technology usage (Kim & Park, 2012; Yan et al., 2016). This study develops its research model by drawing on the theory of reasoned action (TRA) to examine the effects of credibility and utility perceptions on users' initial acceptance and usage behaviors. It further draws on expectation confirmation theory (ECT) to investigate how temporal changes in these beliefs influence users' later-stage continuance intentions.

This study empirically validates the model using data collected in a time-series study of consumer use of online HIS. A user-oriented context is important because the majority of research on online health services has addressed business-related (e.g., m-commerce, e-mall, Internet banking) and public (e.g., e-government, public service delivery) contexts. The Internet has become a universal health information dissemination platform (Hwang, Lee, & Shin, 2016), and consumers are progressively searching for more of their health information online (Yoon, Shin, & Kim, 2015). Online HIS have thus become an important channel for the self-management of users' health (Cho, Yoon, Kim, & Shin, 2015). Yet the contemporary research has not yet extensively examined how the current theories of HIS acceptance and use might extend to online health information. Whereas Yi, Yoon, Davis, and Lee (2013) utilized a time-series analysis, a cross-sectional approach combined with time-series analysis is more appropriate for examining the long-term acceptance and sustained use of HIS (Scherr & Reinemann, 2016). In fact, numerous studies have used time-series cross-sectional analysis in researching the acceptance of health information technology (Sezgin & Ozkan-Yildirim, 2016).

2. Theoretical underpinnings

As a theoretical framework, this study used a combined theoretical frame that integrated the theory of planned behavior (TPB) with ECT; the two theories were useful for analyzing the time-series data in this study. The TPB was used for analyzing the initial, early stage of HIS acceptance; it has been widely and successfully used to provide a holistic understanding and explanation of a diverse range of health-related and social behaviors. ECT has been utilized to explicate continuing intention and post-purchase user satisfaction and behaviors (Oghuma et al., 2016) and to examine the later stages of IT use (Jung, 2011; Shin, 2011).

2.1. Customers' planned behavior

A number of theoretical models of HIS acceptance have been discussed and proposed in previous research. Among them, the TPB, the TRA, and the unified theory of acceptance and use of technology have widely been applied to provide an understanding of HIS adoption (e.g., Featherman & Pavlou, 2003; Mou, Shin, & Cohen, 2016; Yousafzai, Foxall, & Pallister, 2010). The TPB is an extension of the TRA (Ajzen & Fishbein, 1980), and a key argument of the theory is the individual's intention to perform a given behavior. Intentions are assumed to capture the motivational factors that influence a behavior; they indicate how hard people are willing to try, how much effort they are planning to exert, in order to perform the behavior. As a general rule, the stronger the intention to engage in a behavior, the more likely it will be engaged in. In the context of HIS, credibility and PU are considered key psychological factors that can influence user adoption of a service (Pai & Huang, 2011).

2.2. Expectation-confirmation process

ECT is a cognitive theory that seeks to explain post-purchase or post-adoption satisfaction as a function of expectations, perceived performance, and disconfirmation of beliefs. According to the theory, users' intention to continue using a product or service is primarily determined by their satisfaction with prior technology use (Brown, Venkatesh, & Goyal, 2012). Satisfaction has been defined as a psychological effect of the cognitive appraisal of expectation-performance discrepancies (Oghuma et al., 2016; Shin, 2011). Satisfaction also refers to a positive (satisfied), indifferent, or negative (dissatisfied) feeling or attitude that has been theorized and validated in technology acceptance research as a key factor of technology use. In addition, empirical studies show that the continuance intention is positively affected by satisfaction (Liao, Chen, & Yen, 2007; Shin, 2011).

Consumers accept and use HIS and, following a period of initial consumption, form perceptions about the performance, that is, whether a service can help them achieve their goals or not; furthermore, they assess the perceived performance of a HIS compared with their original expectations and determine the extent to which their expectations are confirmed. Because customers' expectations and perceptions of performance can vary, confirmation can be positive when actual performance is higher than expectations; in this case, the consumer is satisfied. However, confirmation can be negative when perceived performance falls short of expectations, and in this case, the consumer will be dissatisfied (Koo, Wati, Park, & Lim, 2011). In turn, this level of satisfaction or dissatisfaction will influence intended behavior.

ECT fits for this investigation because it seeks to explain user behaviors as a function of expectations, perceived performance, and confirmation of beliefs. This study incorporates ECT as a tool to understand the user experience with HIS. Because HIS systems offer various advanced features, it is important to understand both user expectations and how users actually perceive and experience features.

3. Model development and hypotheses

The theoretical foundation of this study is based on the TPB and ECT (Fig. 1). The TPB highlights the early, initial usage phase, whereas ECT supports the later phase. The model integrates both credibility and PU as psychological factors that can influence users' intentions at both the early usage stage and, once modified based on the early adoption experience, at later stages of use.