Understanding the Acceptance of Health Management Mobile Services: Integrating Theory of Planned Behavior and Health Belief Model

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Abstract. With the increasingly aging population and health information technology (IT) advances, self-health management has become an important topic. In particular, middle-aged and elderly people are considered to have higher risks of contracting multiple chronic diseases and complications, thus increasing the need for healthcare. For this reason, the Taiwan Health Promotion Administration (HPA) intends to build the health management mobile service (HMMS) whereby everyone's health records will be stored in the health promotion platform. The HMMS improves transmission of personalized preventive health information to those most in need. Although several prior researches have focused on the factors that impact on the adoption or use of health information management and electronic medical record, however, the literature directly related to people' self-health management behavior toward HMMS is scant. Thus, this study proposes a theoretical model to explain citizen's intention to use a personal health information system in self-health management. A field survey was conducted in Taiwan to collect data from citizens. A total of 105 valid responses were obtained, constituting a response rate of 97.88%. The results indicate that attitude, subjective norm, and perceived susceptibility have positive effects on usage intention. However, perceived behavioral control and perceived severity do not significantly affect behavioral intention. The study has implications on the development of strategies to improve personal health IT acceptance.

Keywords: Self-health management · Health management mobile service
Health belief

1 Introduction

With Taiwan now considered an aging society, middle-aged and elderly people are considered to have higher risks of contracting multiple chronic diseases and complications, thus increasing the need for healthcare. Thus, the Taiwan HPA must meet a

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growing demand for chronic illness and geriatric care. To promote self-health management, the HPA established the mobile-based health promotion platform. This platform acts as a foundation for holistic health management mobile cloud services, enabling citizens to input health-related data and check preventive health records. Thus, the HMMS improves transmission of personalized preventive health information to those most in need. Despite its tremendous potential, about 0.09% of the citizens in Taiwan were using the HMMS to access personal health records. Although several prior researches have focused on the factors that impact on the adoption or use of health information management and electronic medical record [1–3], however, the literature directly related to citizen' self-health management behavior toward health management mobile service is scant. However, the self-management is not a simple activity, but a social and economic, interactive process between citizens and medical institutions. Thus, the existing variables of technology acceptance models do not fully reflect the motives of use. Previous research has suggested the need for incorporating additional health behavior factors to improve the predictive capacity and explanatory power of these dimensions. A variety of health behavior theories can be used to explain the health technology acceptance phenomenon. Among these theories, two theoretical models that have been extensively used to predict patient involvement in health-related behaviors are the health belief model (HBM) [4] and the theory of planned behavior (TPB) [5]. According the TPB and HBM perspective, this study proposes a theoretical model to explain citizens' intention to use of health management mobile service in self-health management.

2 Literature Review

The theory of reasoned action (TRA) [6] suggests that a person's behavior is determined by his or her intention to perform the behavior and that this intention is consequently a function of the person's attitude and his or her subjective norm toward that behavior. Although the TRA has been evaluated and supported in numerous contexts, it offers a weak explanation of the essence of behavior. Ajzen [5] asserted that the TPB eliminated the TRA's limitations regarding managing behavior over which people have incomplete volitional control. Ajzen [5] showed that attitude and subjective norm determine a person's intention to use, and he further proposed that the person's perceived behavioral control (PBC) reflects the degree to which he or she feels that successfully engaging in that behavior is completely under his or her control. Behavioral intention measures the strength of a person's willingness to exert effort when performing certain behavioral activities. Attitude (A) explains the assessment of favorable behavior for the person, which directly influences the strength of the behavior and beliefs regarding the likely outcome. Accordingly, attitude is equated with attitudinal beliefs that link a behavior to a certain outcome weighted by the desirability evaluation of that outcome. Subjective norm (SN) expresses the perceived social pressure of a person who intends to perform a behavior, and is related to normative beliefs regarding the expectations of other people. PBC is composed of human beliefs concerning capability and the controllability of performing the behavior. There are several examples of using the TPB to explain users' behavior, and a number of studies

have applied the TPB to guideline implementations [7, 8]. The HBM tries to explain people's preventive health behaviors and considers health behavior a function of two basic mechanisms: threat perception and behavioral evaluation [9]. Perception of disease threat depends on two beliefs, i.e., the perceived susceptibility to the disease and perceived severity of the disease [9]. Behavioral evaluation is based on the perceived benefits and perceived barriers. Perceived benefits refer to an individual's assessment of the positive consequences of adopting a health behavior, including the extent to which it reduces the risk of the disease or the severity of its consequences. Perceived barriers refer to an individual's assessment of the influences that discourage the adoption of the health action. Prior studies have also shown that the HBM has good explanatory power in predicting users' health IT acceptance [10, 11]. Therefore, this study applies the HMMS to explain citizen's intention to use the HMMS for self-health management. HBM proposes two factors similar to the TPB to explain health behavior. For example, the concepts of perceived benefits and perceived barriers are very similar in notion to attitude and PBC respectively [12, 13]. Meanwhile, the two models are complementary in some aspects. If we combine TPB and HBM to explore influencing factors of behavior, more variance of outcome variables could be explained.

3 Research Model

According the TPB and HBM perspective, we linked the three TPB constructs (i.e., attitude, SN, and PBC) and two HBM constructs (i.e., perceived susceptibility and perceived severity) to behavior intentions. Figure 1 shows the proposed research model.

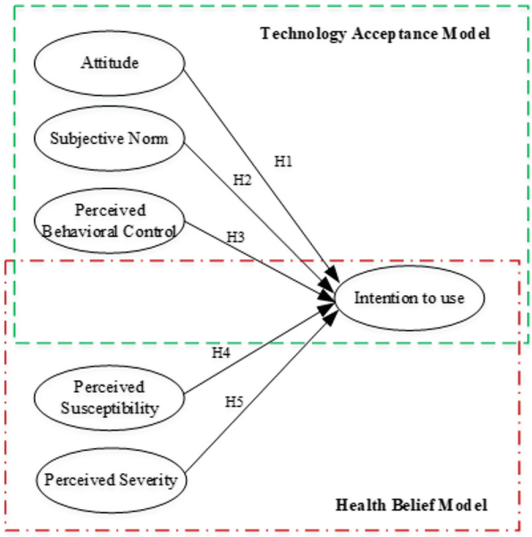

Fig. 1. Research framework

4 Research Methodology

This study employed an online survey for data collection because online surveys provide researchers with various benefits such as saving time and reducing expenses by overcoming geographic distance [14]. We conducted structural equation modeling using partial least squares (PLS) estimations for the data analysis. We tested the reliability and validity of the proposed model. The model was deemed reliable if the construct reliability was greater than 0.8. Convergent validity was assessed based on the following criteria: (a) statistically significant item loading greater than 0.7, (b) composite construct reliability greater than 0.8, and (c) average variance extracted (AVE) greater than 0.5. The discriminant validity of the constructs was assessed based on the criterion that the square root of the AVE for each construct should be greater than the corresponding correlations with all the other constructs [15].

5 Results and Analysis

The 105 valid responses we obtained constitute a response rate of 97.88%. Slightly more than half (53.8%) of the respondents were females. The majority of respondents (62.9%) were between the ages of 20 and 29 years. The education level for 50.8% of the respondents was university. 52.1% of the respondents had more than three years of mobile device usage experience. The construct reliabilities are all greater than 0.9. For the convergent validity, the item loadings are all greater than 0.7, and the AVEs range from 0.63 to 0.89. For the discriminant validity, the square root of the AVE for each construct is greater than its corresponding correlations with the other constructs. These results indicate acceptable reliability and validity. Figure 2 presents the test results for the structural model. The results indicate that attitude, subjective norm, and perceived susceptibility have positive effects on usage intention. However, in our research, perceived behavioral control and perceived severity did not significantly affect behavior intention. These variables together explained 67% of the variance of intention to use.

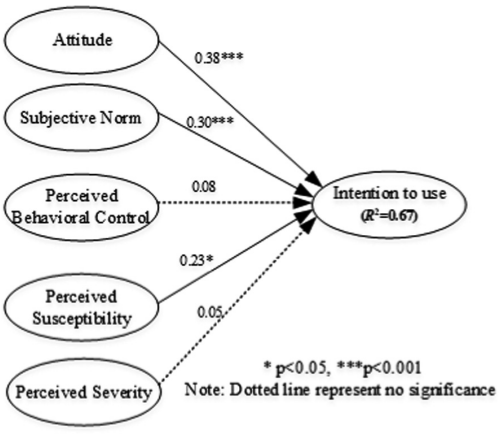

Fig. 2. Results of the structural model

6 Conclusion and Discussion

The effects of these usage intention variables were significant in explaining citizens' usage behavior because they are consistent with Rosenstock [9], who maintained the relative importance of perceived susceptibility, in predicting usage intention varies across behaviors and situations. Thus, individuals who perceive a higher degree of susceptibility are more likely to know their health records so that they can manage and confirm their own health status. This finding is consistent with the result obtained by in Nundy et al. [16]. Furthermore, the results showed that of all the main determinants, subjective norm had the strongest effect on behavioral intention. This result coincides with the findings of previous studies on technology adoption [3]. When a user had a greater perception that most people who are important to them think that they should use a new technology, they are more likely to commit to this perceived pressure and are more willing to use the health management mobile services. Attitude was an influential factor in the elderly peoples' intention to use the HMMS, although its effect was smaller than the subjective norm. This implication coincides with the findings of previous studies on heath IT adoption [17]. This highlights the critical role of attitude in health technology acceptance decision-making by individual users and therefore singles out the importance of attitude cultivation and management to successful health IT implementation. In summary, the main contribution of this study is that it is the first to explore citizen's usage behavior by extant technology acceptance and health behavior theories. The integration approach adopted as the basis of the proposed model provides a more complete set of antecedents that offers a better explanation of citizen's intention to adopt technologies such as the HMMS; thus, enhancing the practical contributions of this study. The results indicate that the research model provides a good understanding of the factors that influence the intention to use the HMMS. We offer implications regarding medical practice and academic research that are based on our findings. We hope that this study will stimulate future interest in the big heath data acceptance phenomena and motivate researchers to examine in greater depth this unexplored yet potentially fertile area of research.

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